4 Nos. only published. Then merged in Teachers' Advocate. See matter last page of last cover.

THE

AMERICAN

JOURNAL OF EDUCATION:

A

MONTHLY MAGAZINE.

9757

EDITED BY

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VOL. I.

NEW-YORK:

PUBLISHED BY LEWIS & BROWN,

272 PEARL STREET.

1847.

VAN GELDER & RILEY, PRINTERS,
268 Bowery.

LIBRARY

INTRODUCTION.

THE usages of journalism seem to require of the editor of a new periodical, a manifesto of his principles, and the purposes which are designed to be effected by his publication. Reviews, literary, scientific and educational periodicals generally, have some distinct objects, which are plainly set forth. Subscribers have a right to exact the rigid fulfilment of all the promises of a prospectus. It is a reasonable requirement therefore, that reliable assurances should be given that the purposes and objects set forth, will be carried out. It is proposed to furnish to that useful and respectable class of men who are engaged in the most important of all professions, that of teaching, and to all others who feel an interest in the advancement of education in our country, just that kind of reading and instruction which they need, and which is not to be found in the ordinary school libraries. Many worthy young teachers, from their isolation from the best society of their profession, and from the want of suitable books, and an educational periodical like the one proposed, have been unable to keep up with the improvements of the age, and their early promise of eminence has failed, not because of any decay or poverty of mind, but because of the penury of the means of improvement, in the new discoveries in the arts and sciences, within their reach. It behooves the teacher of this day to know more than his pupils. His reading must extend beyond his Grammar and Arithmetic. Improvements in the science, and in the art of teaching, are at this time sought for with an unwonted avidity. The respectable teacher now takes his rank in the learned professions, and in many instances his acquirements, his works, and his moral bear-

ing, vindicate him from any charge of professional inferiority. He demonstrates by his works, that there is a psychology that belongs to teaching, as applicable to the primary school as to the university. The processes which aid and facilitate instruction, are founded on science that must be studied, and in order to give them full weight in the community, they must be tested in a practical way. Many theories that look beautifully on paper, like Locke's Constitution of South Carolina, are good for nothing in practice; and many of the failures among experimenting and practical men are owing to their being founded upon theories, in opposition to true mental philosophy.

How, it will be asked, is an AMERICAN JOURNAL OF EDUCATION to be sustained? and what claims to pre-eminence can it put forth over other works already before the public? These are reasonable inquiries, and ought to be answered. The editor of this Journal does not expect by his own unaided pen to fill the columns of his work. He is not so arrogant or so vain as to claim superior wisdom. He expects contributions from the best writers on education, science and literature, in all parts of the country, and hopes to have some good correspondence from abroad. He will receive the best foreign periodicals, and hopes his eclectic skill will not be disparagingly estimated by the readers of the Journal. Our work is large enough to allow this. Our general subject expansive, our topics numerous, and the field is the world. Our readers will want to know what has been done in this behalf, in other countries, as well as in our own. This want is to be supplied. This thought will suggest itself to the intelligent reader on perusing this introduction. If there are to be so many writers and correspondents, there can be no harmony of design or unity of purpose in carrying out any particular theory of government, or system of education! Very true: but the editor has judged that such unity of plan among writers and correspondents, is impracticable; and that it would be undesirable, if it were practicable. They will undoubtedly differ in many matters of detail, and sometimes on points involving principles. And why should they not? A comparison of deductions drawn from different aspects of a subject, as they are presented to different individuals,

modify and extend our views; and discussion tends to elicit light and extend the boundaries of knowledge. While the editor expects contributors to enjoy a free exercise of their own sentiments, he will not hold himself responsible for every opinion, nor chargeable with inconsistency for publishing opinions that are adverse to his own, so long as they are well written, and upon topics that are open to discussion. While he would avoid and exclude all personal attack or censure, he will feel himself at liberty to examine and remark upon any publication that comes within the prescribed province of this Journal. This duty will, however, be exercised with caution; and care taken that this shall not be made a vehicle of praise or censure of books designed for the use of the Schools or Seminaries of our country, farther than a just criticism demands. The worst thing he intends to do with a bad book when it appears, will be, not to notice it.

Our name, the American Journal of Education, is comprehensive, and leaves open for our lucubrations and selections, a great variety of topics. It has been chosen for this reason. There is no department of instruction suited to the youth, or adults of our country, but what may be legitimately embraced in our plan, excluding always controversial essays on politics and religion, which the editor adjudges would be prejudicial to the cause which he designs to advance. These last two topics are amply discussed everywhere else, and may reasonably be excluded from a periodical which seeks general patronage from the friends of education.

The statistics of education, and the statistics of pauperism and crime consequent upon a want of a proper education, will incidentally claim a place in this Journal. The importance of these will be acknowledged, when it is remembered that these classes form so large a portion of the basis of society in many places, that a change in these for the better, would improve the condition of society at large. It will, therefore, be but a slight and pardonable digression from the main design, to give an occasional article on the eleemosynary and punitive institutions of our country, with some account of the reformatory processes that are now in progress for their melioration. The cause of

humanity should be allowed a place in every system of Christian education.

Public sentiment, and more especially the opinions of the great body of teachers in our country on the subject of this periodical, may be seen from the Report and Resolutions of a Committee specially appointed for that purpose, made to the Association of Teachers of the State of New York, at their annual meeting in August last, in Utica, on a Teacher's Periodical. This Report and Resolution were reaffirmed and commended to the public in November, at Newark, by the State Society of New Jersey--*without one dissenting voice in either State.*

"The Committee to whom was assigned the duty of preparing a Report on the subject of a Periodical for the Teachers of this Association and State, have considered the matter, and deem it one of importance to the character of the profession.

"In the incipient stages of a great enterprise, which is designed to affect in important particulars the whole substratum of society, such means and appliances as will exert a good moral influence, and best promote the cause to be subserved, seems both lawful and expedient. Popular appeals, and forceful publications in the ephemeral newspaper, are perhaps the most direct mode of reaching the public ear, and arousing the public attention to the great and vital interests of the community. But when the public ear has been gained, and the public mind excited, it is proper that they should be instructed. When advancement has been made in the enterprise, and when the persons who are to give momentum to the work are brought together in sentiment, and in organized convocations, it seems plainly to your committee to be the duty of such body to provide means, as speedily as possible, for the accomplishment of the objects of such organization. When the minds of a whole class of men flow onward together, obstacles are overcome. Their cumulative power manifests energy not easily resisted. Regarding the whole educational profession as a unity, it imbodies a large number of educated men, capable, if their learning and ability can be made available, to sustain a Quarterly Review, or a Monthly Magazine, that will do honor to them as individuals and give reputation and instruction to the profession. Such periodical should contain essays on the principles of education. It should contain systems of instruction, in which are brought out the theories of the most learned, and the experience of the wisest practical Teachers. It should contain reviews and criticisms on every subject of instruction that assumes, or is likely to assume, importance with the people. Works on philosophy, on history, on geography, on physiology, on all the departments of natural, physical and mathematical science, should be reviewed with ability and candor, by persons qualified for the task, who have no personal interest in their success or adoption in the schools. The condition and history of education in the different countries; and the theory and practice of instruction in the master states of the world, both ancient and

modern, afford suitable subjects for a Teacher's periodical—a publication that should be as professional in its character as the Theological Reviews, the Medical and Surgical Journals, or the Law Reports, that are now published for the benefit and convenience of their respective professions.

An undertaking of this kind appears to your committee feasible, and not of doubtful utility. If the best educated men connected with public instruction were fairly committed to the sustaining of such a Journal—if they felt that the character of our country and the interests of literature and science were to be promoted by its establishment—if writers were allowed a reasonable compensation for their contributions, so that they might afford to elaborate them with their best abilities; and moreover if such periodical were commenced under favorable auspices, in a suitable location, with the countenance of the profession in this great state, it would at once assume somewhat of a national character, obtain subscriptions from other states, and thus while it became self-sustaining, it would diffuse knowledge among the brotherhood of instructors in our own country, that would call forth the congratulations of the best class of wise men in other lands.

There are many circumstances that seem to indicate the propriety of establishing a Monthly Magazine, or Journal of Education, in this State. It is, perhaps, not to be expected that any one periodical should be adapted to the wants and the means of all Teachers. Nor is it desirable that there should be many such publications. It is better that the needful talent and patronage should be concentrated upon one or two.

The District School Journal published in Albany, and gratuitously distributed to the District Schools of the State, supplies a place in the publication of matters connected with educational affairs that need not, perhaps ought not, to be meddled with by any other publication. Teachers are unable to bear the expense of many papers, and as the District School Journal is freely distributed, and as it contains all, or nearly all that it is necessary to publish relating to the Reports of Superintendents, and in relation to laws and decisions of School Officers, it seems to your Committee unnecessary to tax the Teachers to pay for another periodical containing the same or nearly the same matter.

"Again: as common newspapers are published in most of the counties of the State, and universally read by the educated portion of the people, it does not seem to your Committee to be necessary that a Teacher's Periodical, of infrequent issue, should be made up of extracts from the current news of the day, which subscribers generally will have seen before their Teachers' Periodical comes to hand. A *jeu d'esprit*, a summary of news, or an occasional anecdote, may be well enough, but no considerable portion of a paper, avowedly for other purposes, ought to be given up to matters irrelevant to the main design.

"If this association are of opinion that the newspaper form is the best for an organ of intercommunication among themselves, and for the dissemination of the principles of their organization, then in the opinion of the Committee the price ought to be reduced to one dollar, so that its circulation may be increased, and extended to every hamlet school in the State.

"With regard to the *Monthly Periodical* which they have proposed, they submit the following resolutions:

"*Resolved*, that a Committee of five be appointed by this Association for the purpose of carrying forth, at their discretion, the establishment and publication of a MONTHLY PERIODICAL, as recommended in the foregoing Report.

Signed, { JOSEPH McKEEN, WILLIAM BELDEN, Jun.

"The Report was adopted with the accompanying Resolution.

"Mr. McKeen of New York, Mr. Bulkley of Albany, Mr. Everson of Cayuga, Mr. Day of Ontario, and Mr. Morris of New York, were chosen to constitute a Committee to carry out the views set forth in the Report."

The ardour and spontaneity with which the whole profession are calling for a standard work, in which the best writings on education, as they from time to time appear, may be inserted in a suitable form for binding and preservation, induce the publishers to embark in this enterprise, trusting that they will receive favor and patronage commensurate with the merits of their work.

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The Progress of Science.

Could the wisest of Egyptian magi, or the most profound of Greek philosophers, be permitted to return to the ranks of science, we think we can imagine, in some degree, the extent of their admiration and astonishment. In these days, when one discovery succeeds another so rapidly, as scarcely to produce a nine days' wonder, it, at first, seems difficult to account for the slow progress of science during six thousand years of our world's history. Yet, when we take into consideration a few circumstances:—the small portion of the world as known to the ancients, marked by any activity of mind—Egypt, India, the coast of the Levant, Greece, Italy, and Arabia; the restricted education of the masses;—the limited access to writing;—the immense regard paid to physical over intellectual renown;—the limited correspondence between mind separated by distance, often more completely by war and intestine commotion; we find no difficulty in satisfying ourselves as to the advantages we of the present possess over the past.

It would be interesting to trace the connection between freedom of thought, and scientific discovery. Our limits forbid this. We simply and necessarily advert to it in passing, as we believe it to be the grand power that gave that remarkable impulse and activity to mind, towards the close of the 15th century. Night and day differed not more completely than did the period preceding the time we have named, and that which has succeeded. Aroused from its long sleep, the human mind woke with a giant's powers. The discovery of a new world, the invention of the compass and

the art of printing; the reformation of the church; the elucidation of the true solar system followed each other so rapidly, that now, at the distance of nearly four centuries, it seems more like an oriental dream, than a reality. The shackles of the schools, however, were not so easily thrown off. Reasoning and science had been confined within a circle. An endless variety of subtleties and puerilities occupied the attention of the grave and the learned; and the true end of all learning—progress—was forgotten. It is the proud boast of England that Francis Bacon was the first whose genius was equal to the task of explaining, and enforcing by the cogency of his arguments and the simplicity of his style, an adherence to the principles of a new philosophy. We are aware that in the opposition to the doctrines of Aristotle, which arose towards the end of the fifteenth century, the basis of the inductive system had been insisted on and carried out, particularly in the labors of Copernicus, Galileo, Kepler, during the sixteenth. But as the elucidation and arrangement of a new system, the Novum Organum of Bacon, must ever remain a monument of his genius and eloquence, and the time of its publication be considered as the commencement of a new era in philosophy. Theory was restricted to its proper place, as the result of experiment. Investigation and observation were substituted for conjecture. Each of the sciences hitherto studied under the head of natural philosophy, gradually fascinated devoted and ardent inquirers; new impulses were given, and discovery followed discovery in rapid succession.

It is, however, to the progress of astronomical science that we wish to draw attention, in a hasty and necessarily limited manner. The recent discovery of a new planet has awakened a fresh interest in the study of the heavens. We hope, therefore, that a few remarks will not be deemed out of place, as preliminary to the notice of the circumstances attending the discovery of Leverrier, and which follows this article.

To Nicholaus Copernicus, born at Thorn in Prussia, in the year 1473, belongs the honorable title of Restorer of Astronomy. At an early period of his studies, this great man became dissatisfied with the complex system known as the Ptolemaic, deeming it, with

its epicycles, deferents, spheres, &c., insufficient to account for the various phenomena deduced from the vast number of observations, that had been accumulating during the latter half of the fifteenth century. These were the results of the labors of Purbach, John Muller, otherwise called Regio Montanus, Walther, and Wemer, and contributed in bringing Copernicus to the conclusion, that simplicity must be the grand feature of a true system. Discarding the long-received doctrines of Plato and Aristotle, he gradually became convinced of the correctness of his conjectures. We say gradually, because a period of thirty years elapsed, before he could completely satisfy himself of the correctness of his hypothesis. It was not till two days before his death, in the year 1543, that his immortal work, "De Revolutionibus Orbium Cœlestium," was printed. The manuscript had been finished thirteen years previous, in 1530, but so extremely cautious was he in opposing long-established opinions, that only at the earnest persuasion of his most intimate friends, did he consent to give it to the world, coupled with a dedication to the Pope, in which he earnestly besought the sanction of the church. In this work the Ptolemaic doctrine is completely overthrown, and that of Pythagoras placing the sun in the centre, and the heavenly bodies revolving round it, is demonstrated with great beauty and simplicity.

The progress of the new theory was slow, but constant. Like good seed, the truth fell into truth-loving minds; but it wanted opposition and persecution to scatter it broadcast throughout Europe. The time at length arrived, and Galileo, towards the beginning of the seventeenth century, appeared. Born at Pisa, in 1564, and gifted with an acute and philosophic mind, he soon gained the attention of the patrons of literature, by the depth and variety of his acquirements. It was not, however, till after the year 1593, as his letter to Kepler indicates, that he became a convert to the Copernican doctrine. His deep-rooted hostility to the doctrines of Aristotle, became if possible more inveterate by the adoption of his new views, and we soon find him, with all the ardor and enthusiasm of a young convert; from the chair of phi-

losophy he occupied; in treatises; in conversations, in public and in private; and especially in his still preserved dialogues; assailing the Ptolemaic doctrines, with all the combined force of argument, wit and ridicule. By his uncompromising hostility, this lover of truth had steadily increased the number of his enemies. Everywhere, he was met with the utmost rancor by the schoolmen. At that time "the schools" were but another name for the church; and it was not long before he felt the full weight of ecclesiastical censure. In his celebrated trial before the inquisition, Galileo was forced to abjure the opinions he had embraced and expounded; and Aristotle and Ptolemy, seemed once more triumphant.

On the conduct of Galileo on this ever-memorable occasion, the scope of this article forbids us enlarging. High names have sanctioned the severest censures. We believe these alike unnecessary and unjust. At another time, we hope to be able to say somewhat in defence of Galileo. Neither are we convinced, by any means, that his conduct was so detrimental to the progress of science as some have lamented. We cannot help thinking that his persecution fanned into a flame the embers of true philosophy. Tycho Brahe, the celebrated Dane, it is true, labored to establish his improved Ptolemaic system, but however ingenious in theory, and supported by the labors of this distinguished astronomer, it never gained a footing among philosophers. The more simple system of Copernicus steadily progressed, and met with the general approval of unprejudiced minds.

Besides the labors of Galileo, in explaining and promulgating the true system, astronomy is indebted to him for the first application of the telescope to astronomical observations. The discovery of Jupiter's satellites, and Saturn's rings, and the first observations on the moon's surface, are among the results of his labors. The telescope introduced a new epoch in the history of the science.

The labors of Tycho Brahe, born in 1546, three years after the death of Copernicus, and eighteen before the year in which Galileo was born, are worthy of our passing attention, and remarkable not only for their number and value, but also that they formed the basis from which Kepler proved the truth of his celebrated laws,

An exile through bitter persecution, he was cut off while yet in his full vigor, at the age of 59, and while he yet might have done much for astronomical science. His instruments, the fruits of his own invention, were at the time the most celebrated throughout Europe. These and his great fame as an observer, attracted to Uraniburg, the most gifted minds of the period. "Admiring disciples crowded to this sanctuary of the sciences, to acquire the knowledge of the heavens; and kings and princes felt themselves honored by becoming the guests of the great astronomer of the age."

But it is to the genius of Kepler, unquestionably the founder of modern astronomy, that we turn with the highest admiration. Imbued with a strong passion for discovering analogies in nature, he became, in his 29th year, a colleague of Tycho Brahe. Well was it for Kepler's fame and the interests of science, that the influence of this patient observer, was brought to bear on the extravagant enthusiasm of his assistant. Tycho advised Kepler to control his imagination, and pointed out to him, in advance even of the Baconian philosophy, the only method of arriving at truth, observation. The effect of his advice was most happy, and the result of seventeen years' labor, the most incessant that can be imagined, rendered the name of Kepler immortal. It is pleasing to think his case was one in which genius was permitted to enjoy a confidence in the universal praise of posterity, seldom enjoyed. There can be no apology needed for quoting his own eloquent words, appended to his celebrated work, "The Harmonies of the World," published in the year 1619. Speaking of his discovery—the third, of his great laws, he says, "Nothing holds me, I will indulge my sacred fury; I will triumph over mankind, by the honest confession that I have stolen the golden vases of the Egyptians, to build up a tabernacle for my God, far away from the confines of Egypt. If you forgive me I rejoice; if you are angry, I can bear it. The die is cast; the book is written, to be read either now or by posterity, I care not which. It may well wait a century for a reader, as God has waited six thousand years for an observer." His great discoveries, known as Kepler's three laws, were 1st, the motion of the planets in elliptical orbits; 2nd the proportionality between the areas described,

and their times of description: and 3d, the relation between the squares of their periodic times and the cubes of their distances. The first and second of these were given to the world in 1609. eight years after the commencement of his connection with Tycho —and the third, as we have stated, was promulgated in 1618. These three laws form the basis of physical astronomy. We cannot at this time, further particularize the labors of Kepler; suffice it to say, that in addition to multifarious services rendered to his favorite science, he suspected the existence of some principle analagous to gravitation, and taught that the cause of tides was attributable to the attraction of the sun and moon.

In 1630 Kepler died, worn out by anxiety of mind and pecuniary embarrassment. His death was succeeded by that of Galileo in 1642, in the month of January of the same year in which Newton was born. The chain was complete. Such a successor to the labors of Kepler and Galileo, strikes us as remarkable. It needed the patience of a Newton to complete and apply the discoveries of Kepler, and the observations of Galileo. In the meantime the laws of central forces, of the greatest importance in the theory of planetary revolutions, were first proposed by Huygens, the astronomer and philosopher, in his work entitled Horologium Oscillatorium. The doctrine of a central force is a necessary inference from the second law of Kepler, that a straight line drawn from the centre of the sun to the planet, describes equal areas in equal times, or rather it ought to be said, that central force is the law producing the fact discovered by Kepler. In the year 1666, Newton's attention was drawn to the subject of gravity. He was at this time about twenty three years of age. For several reasons he was unable to verify the truth of his speculations, regarding "the space through which the moon falls to the earth in a second of time, while revolving in a circular orbit." His absence from books of reference, and the want of the proper measurement of a degree of the meridian, prevented him from continuing further inquiries at this time, and threw some doubt on his conjectures. From this period till the year 1679, his attention was occupied with his celebrated researches into the laws of light; in this year, it was again directed to the sub-

ject of gravity, and the result was the discovery of the law of universal gravitation. In the words of Brewster, this principle, as deduced from the motion of the moon, and the three laws of Kepler, coupled with the doctrine of central forces, may be stated thus; *that every particle of matter is attracted by, or gravitates to, every other particle, with a force inversely proportional to the squares of their distances.* At the meeting of the royal society, 28th April, 1686, the manuscript of the first book of his Principia was presented to that honorable body; on the 2d of March 1687, the second, and the third was sent in on the 6th of the following month. These books, the most remarkable in the productions of human intellect, were published under the auspices of the society, and the immediate superintendence of Dr. Halley, the friend and contemporary of Newton. The Principia has for its object, in the first and second books, the discussions of the motions of bodies, and the third treats of the constitution of the system of the world. In these, his great discovery is demonstrated with a profundity equal to the vastness of the subject, and they require mathematical powers of a high order fully to appreciate, or indeed understand them. His further investigations led him to suspect the spheroidal form of the earth, which he successfully demonstrated, to which was added, ere long, the explanation of the theory of the tides. This short sketch of Newton's labors, and his position as a philosopher, as immediately connected with astronomy, cannot better be concluded, than in the words of the following epitaph, a translation of that inscribed on his monument in Westminster Abbey.

Here lies
ISAAC NEWTON, Knight,
Who, by a Vigor of Mind almost Supernatural,
First Demonstrated
The Motions and Figures of the Planets;
The Paths of the Comets, and Tides of the Ocean;
He diligently investigated
The different Refrangibilities of the Rays of Light:
And the properties of the Colours to which they give rise.
An assiduous, sagacious, and faithful Interpreter
Of Nature, of Antiquity, and the Holy Scriptures:
He asserted in his Philosophy, the Majesty of God,
And exhibited in his conduct the simplicity of the Gospel.
Let Mortals rejoice
That there has existed such, and so great
AN ORNAMENT OF HUMAN NATURE.
Born 25th December, 1642. Died 20th March, 1727.

Dr. Halley, who has been mentioned as the friend of Newton, having obtained three different observations of the comet of 1682, by the applications of the principles which Newton had submitted, determined its parabolic orbit, and predicted its return in the year 1759. His prophecy was verified by its return on that year, and obtained for it the name of Halley's comet. The erratic courses of these strange visiters, were from that time surely and certainly determined, and the world liberated from the fears that they had hitherto occasioned.

We pass over the labors of Bird and Bradley, the successors of Halley, as well as those of celebrated mathematicians of the continent, Clairault, Euler, Mayer, D'Alembert, De La Caille, &c. Their investigations and improvements in solar and lunar tables are too complex for a compendium like the present; suffice it to say, that they were of immense value, and particularly so in connection with the art of navigation. We are besides indebted to the astronomers of this period, for the invention and improvements of instruments for astronomical observations, and particularly of the telescope. This brings us to notice the enlargement of the bounds of our system, by the discovery of Uranus, with the powerful telescope of Dr. Herschel.

While engaged at Bath, in sweeping the heavens with this incomparable instrument, he was led to conjecture that this body (hitherto seen by Flamstead, Bradley and Mayer, and laid down by them in their catalogues of fixed stars), was not a star. Succeeding observations confirmed him in the truth of his conjectures, and Uranus, (called by its discoverer Georgium Sidus,) was added to the planetary system. By the strong magnifying power of his telescope, Herschel discovered six satellites; although succeeding observations have not enabled astronomers to detect more than two.

The unoccupied space between the orbits of Mars and Jupiter, led Kepler to suppose that there must exist an unknown planet. This supposition was proved to be correct, by the discovery of Ceres, by Piazzi, on the 1st of January, 1801. This was followed by that of Pallas, by Dr. Olbers of Bremen, 28th March, 1802. On the 22d of September, 1804, Professor Harding of Lillienthal,

(near Bremen,) detected another, which he called Juno, and Dr. Olbers on the 29th March, 1807, saw, for the first time, a fourth, which has been named Vesta. A fifth has been added by the discovery of Astrea, by Professor Hencke of Dresden, on the 8th of Dec., 1845. To all these the fanciful name of asteroids has been given, although this appellation is repudiated by many astronomers. They have been more properly styled extra zodiacal planets, because their inclinations are greater than that of Mercury, the inclination of the last having hitherto defined the limits of the zodiac.

In a notice of the labors of modern astronomers, the name of Laplace, next to that of Newton, deserves the most honorable mention. His remarkable works, the Mechanique Celeste, and Systiema de Monde, may be classed among the most wonderful productions of the human intellect. In these physico-mathematical works, he has elaborately investigated all the phenomena which the attraction, or universal gravitation of matter, can produce on the forms or motions of the celestial bodies, by their mutual action upon each other; and his theory is justly celebrated as being the first which endeavoured to account for the formation of our system, on purely mechanical principles, without adducing another law than that of universal gravitation.

Besides the contributions of Laplace, the science in the nineteenth century has been enriched by the discovery, that double stars revolve round each other in elliptical orbits. In the years 1803—4, the elder Herschel announced the fact to the royal astronomical society, and the labors of M. Savary and of Sir John Herschel, seem to have established this truth beyond cavil. So sensible was the astronomical society of the labors of the latter, that they voted him one of the medals, and the honor of knighthood was conferred on him by his sovereign.

Another discovery is that of professor Encke, of Germany, as late as the year 1822, viz., the existence of a resisting medium in the planetary regions. The evidence upon which this doctrine rests is not indeed demonstrative, nor is it placed beyond the reach of dispute; future discoveries can alone determine whether there

may not exist a combination of causes, which shall explain the motions of the planets, without supposing a resisting medium.

Professor Airy has also highly distinguished himself, by computing the inequality of the long period of Venus and the Earth; and by the determination of Jupiter's mass, thereby rectifying the errors in the computation of Laplace. The solar, lunar, and planetary tables have by this been rendered more nearly perfect, and practical navigation greatly benefitted.

While the highest encomiums might with justice be lavished on the assiduity, patience and enterprise of the English and German schools, the brilliant contributions of the French obtain our unqualified admiration. La Lande, Biot, Laplace, Lagrange, are names of which a Frenchman may indeed be proud. The galaxy has been rendered more brilliant by the addition of a new name, *Leverrier*. The splendor of his discovery excites within us the liveliest feelings of admiration, and reflects honor not on France, not on Europe, but on the race. Such a triumph of the intellect elevates humanity. In the footsteps of such a victory, there follows no misery; it is hailed as a universal triumph.

Now that the prophecy of Leverrier has been verified by observation, and the limits of our planetary system seem to have been explored, must we conclude that further advancement is an idle dream? We cannot better answer this question, or check the confidence which arises, as we survey the advancements which have been made, than by quoting the following from the pen of an eloquent writer, premising that it was written before the discovery of the new planet. "The state of perfection to which astronomy is now brought, may be regarded as the greatest triumph of human exertion and reason. The resistance of ether, the nature of comets, the constitution of the nebulæ, the laws which regulate the formation and motions of sidereal systems; such are the questions, (questions indeed remote from any practical application to the affairs of mankind,) which philosophers aspire to solve. The motions of the moon and planets are known with the utmost accuracy; and the tables have all the precision which the practical astronomer can desire. *Our knowledge of the planetary system may be regarded as complete.*"

The new planet has proved the confidence expressed in the above, premature. Should we make use of the same language now, and with equal confidence, future discoveries might require its modification. The limits of discovery are beyond our ken. That there does exist such a limit, seems demonstrable. But the *future*, and that alone, proves or disproves the truth of all conjecture.

Asking the kind indulgence of our readers for the cursory manner in which our limits have forced us to treat this important subject, we would recommend their attention to the following notice of Leverrier's planet, as copied from the Paris correspondence of the *Charleston Courier.*

"Let me chronicle an event, which to me, to you, and to all the world, is infinitely interesting: I allude to the recent discovery of the new planet *Leverrier*, belonging to our solar system, 230 times larger than our earth, and 1325 millions of miles beyond the orbit of *Herschel*, being 3125 millions of miles distant from the Sun. The discovery of this planet ranks among the noblest and most astonishing triumphs of the human mind, and will place the name of Leverrier, immortal, and far above those of the Alexanders and Cæsars and Bonapartes of the earth, beside those of Newton and Franklin, on the scroll of fame.

For many years past astronomers have observed irregularities in the motion of the planet Herschel, which they have been unable to account for. The perturbations were referable to no known laws. After the most diligent and anxious search, no sufficient and satisfactory cause had been discovered for these worrying anomalies, and the wisest of them had come to the conclusion that there were yet secrets in their philosophy which had not been dreamed of. Leverrier, (or, as his name is sometimes written, Le Verrier,) a young Parisian astronomer, made these irregularities in the motions of the planet the subject of his especial study. His close and long and intelligent observation of them led him to the conclusion that there was a disturbing planet belonging to our system, not yet discovered, and far beyond the orbit of Herschel. The more he calculated and the longer he meditated upon this subject in the solitude of his study, the more convinced was he that his theory was fact—till at last, as the result not of heated and distempered imagination unduly magnifying a favorite idea, but as the sure result of long and weary arithmetical calculations, of the dispassionate, cool, intelligent application of known mathematical and astronomical principles, his persuasions became certainty. He calculated what must be the size and distance, and position of the unseen planet, in order that the effects observed and observable upon the motion of Herschel should be produced by the power of attraction: and when all was done, he made known the result of his labors, averred the existence of a planet beyond Herschel, of such a size, at such a distance from the sun; he pointed out its path, and predicted that at such a time and in such a quarter of the heavens, it would come within the scope of mortal vision, and he wrote to foreign astronomers having the use of more powerful instruments than any within his reach, directing their attention to the quarter indicated, and requested them to give

the first notice of the stranger's approach. M. Arago, the illustrious French Astronomer, has published in one of the Paris papers the following note upon the subject:

"On examining with care the analytical theory of Uranus, M. Leverrier ascertained that the great irregularity shown by the observations that had been made on the motion of this planet arose from the action of an unknown body, whose exact position and diameter he determined by calculation. All the predictions of the theory have just been verified, and our solar system is enriched by a planet which is 1250 millions of leagues (about 3125 millions of English miles,) distant from the sun. Its volume is about 230 times that of the earth. The following is an extract of a letter received by M. Leverrier from M. Galle, an astronomer at Berlin, and dated the 25th ult: "The planet, whose position you have described, really exists. On the same day that I received your letter, I discovered a star, of the eighth magnitude, which is not marked upon the excellent chart of Doctor Bremiker, and which forms part of the collection of celestial charts published by the Royal Academy of Berlin. The observations on the following night showed that this star is precisely the planet in question. Mr. Encke and I have, with the aid of Fraunhofer's telescope, compared it with a star of the ninth magnitude." Astronomers will learn with pleasure that the position of the new planet is precisely that which M. Leverrier assigned to it in the theory which he had sent to M. Galle, and which is given in the report of the proceedings of the Academy of Sciences of the 1st ult. The diameter, resulting from the observations at Berlin, is of three seconds, as M. Leverrier had said. M. Galle appears disposed to call the new planet *Janus*, from considerations borrowed from the hypothesis that it may be on the confines of our solar system. M. Leverrier, to whom belongs the right of naming it, does not agree to the too significative name of *Janus*, but will consent to any other—*Neptune*, for instance which would have the assent of astronomers.

I translate from a paper lately read by M. Leverrier before the Academy of Sciences, the following remarks on this subject. "The article which has just been read was drawn up when I received from M. Galle, of Berlin, whose name is often mentioned with honor in this assembly, the intelligence that he had seen the planet sought for, exactly in the place which I had designated. I had written on the 18th of September to M. Galle, requesting his concurrence. It is known that this able astronomer discovered the planet on the very day that he received my letter. It will not be uninteresting to compare the position of the star resulting from his observations with that which I myself had made known, deduced solely from the perturbations of Uranus.

Mean-time of Berlin, 23d Sept. 12h. 0m. 14s.

	deg.	min.	sec.
Observed right ascension	320	19	16 0
Observed declination	13	24	8 2
Geocentric Longitude		325°	53
Reduction to the heliocentric place		0	59
Heliocentric longitude on the 23d Sept.		326°	52
Movement in .0275 years			32
Heliocentric longitude concluded to the 1st Jan. 1847.		327°	24
Longitude deduced from the perturbations and given in the reports of 31st August, 1845.		326°	32
Difference,		0	52

Thus it appears that the position was foreseen within less than a degree. This error will be deemed very small when one considers the slightness of the perturbation from which the place of the star had to be determined. This success gives us reason to hope that after the new planet has been observed for thirty or forty years, it may in its turn, be employed for the discovery of that which next follows it in the order of distances from the sun; and so on. Soon, however, stars will unfortunately be met with, invisible because of their immense distance, but whose orbits may be traced with great exactitude by means of the theory."

M. Arago notified M. Salvandy, Minister of Public Instruction, of the discovery which had just been made. The latter consulted with the King, and afterwards wrote to the Academy the following letter:

"I think it my duty to inform the Academy of Sciences, that in consideration of the event which is now agitating the scientific world, the King has been pleased to nominate M. Le Verrier, officer of the Royal Order of the Legion of Honor. He has not the legal time; but science has its exceptional services and its illustrious actions as well as war. The labors of M. Le Verrier are of the kind that honor our age and France. The Academy and also M. Le Verrier, will be happy to learn that it has pleased the King at the same time to nominate M. Galle of Berlin, Knight of the Royal Order of the Legion of Honor. The justice of his majesty ought not to separate two names which will remain gloriously united in the history of the most brilliant discoveries, and the rarest efforts of the human mind. I have desired that the royal distinctions should be conferred upon its member, and upon the learned stranger who have deserved them, through the medium, and under the auspices of the Academy of Sciences, in order the better to proportion the brilliancy of the reward to that of the work and its results."

M. Arago upon this occasion played a most honorable and magnanimous part, and gave most gratifying evidence of the enlarging and liberalizing tendencies of the professions of the sciences. No mean jealousy envied his rival's glory. Not a leaf that belonged to it should with his consent, be plucked from Le Verrier's crown. "What name shall the new planet have?" was the order of the day. "That of him who produced it," exclaimed Arago—"the name of *Le Verrier!* France will accept no other!" and he might have said, I trust, "The world will accept no other." Away with the heathenish names of Janus and Neptune and Minerva! Place that of Leverrier in the skies he has so proudly scanned, by connecting it for ever with the planet he has discovered. Let them live, and when time shall cease, be extinguished together. He deserves such an honor, if ever man did. That is the only *star* that can really honor him.

The numerous auditory present at that sitting of the Academy, welcomed, with great satisfaction, the suggestion of Arago. This new planet is the largest of our system, after Jupiter and Saturn, and like them, will probably prove to be attended by its train of satellites. But, it is doubtful whether, at so great a distance, we shall ever have the pleasure of seeing so small bodies as they must be. Leverrier comes to the meridian now a few minutes before nine, and is seen near to Saturn. With a magnifying power less than 200, it is not distinguishable from a fixed star. Simultaneous observations are being made, at all the principal European observatories, in order to come to a precision on several points relating to Leverrier, and minute scientific details

are sent to the directors of the observatories at Mexico, the Cape of Good Hope and Calcutta, in order that each may study the new star in the different latitudes in which they are placed.

Roger Ascham.

It will be seen by the following extracts from the writings of a celebrated teacher, who lived four and a half centuries ago, that very correct notions on the subject of education were entertained at that time. It may be true, that Roger Ascham was much in advance of the age in which he lived, but we question whether any one since his time, has thought deeper, or written better.

"A very distinguished instructive writer of this age was ROGER ASCHAM, university orator at Cambridge, at one time preceptor, and ultimately Latin secretary, to queen Elizabeth. He must be considered as the first writer on education in our language, and it is remarkable that many of his views on this subject accord with the most enlightened of modern times. His writings themselves furnished an improved example of style, and they abound in sound sense and excellent instructions. We are the more called on to admire them, when we reflect on the tendency of learned men in that age to waste their talents and acquirements on profitless controversy—which was so strong a passion, that, whenever Sir John Cheke was temporarily absent from Cambridge, his associates immediately forsook the elegant studies to which he had tempted them, and fell into disputes about predestination, original sin, &c. Ascham died in 1568, and Elizabeth did him the honour to remark, that she would rather have given ten thousand pounds than lost him. His principal work, *The Schoolmaster*, printed by his widow, contains, besides the good general views of education above alluded to, what Johnson has acknowledged to be 'perhaps the best advice that ever was given for the study of languages.' It also presents judicious characters of ancient authors. Another work, entitled *Toxophilus*, published in 1544, is a dialogue on the Art of Archery, designed to promote an elegant and useful mode of recreation among those who, like himself, gave most of their time to study, and also to exemplify a style of composition more purely English, than what was generally practised. Ascham also wrote a discourse on the affairs of Germany, where he had spent

three years in attendance on the English ambassador during the reign of Edward VI. The following extracts from Ascham's writings show generally an intellect much in advance of his age:--

"It is pity that commonly more care is had, and that among very wise men, to find out rather a cunning man for their horse, than a cunning man for their children. To the one they will gladly give a stipend of 200 crowns by the year, and loth to offer the other 200 shillings. God, that sitteth in heaven, laugheth their choice to scorn, and rewardeth their liberality as it should; for he suffereth them to have tame and well ordered horse, but wild and unfortunate children.

"One example, whether love or fear doth work more in a child for virtue and learning, I will gladly report; which may be heard with some pleasure, and followed with more profit. Before I went into Germany, I came to Broadgate, in Leicestershire, to take my leave of that noble Lady Jane Grey, to whom I was exceeding much beholden. Her parents, the duke and the duchess, with all the household, gentlemen and gentlewomen, were hunting in the park. I found her in her chamber, reading Phædon Platonis in Greek, and that with as much delight as some gentlemen would read a merry tale in Bocace. After salutation and duty done, with some other talk, I asked her, why she would lose such pastime in the park? Smiling, she answered me, "I wiss, all their sport in the park is but a shadow to that pleasure that I find in Plato? Alas! good folk, they never 'felt what true pleasure meant.' 'And how came you, Madam,' quoth I, 'to this deep knowledge of pleasure? And what did chiefly allure you unto it, seeing not many women, but very few men, have attained thereunto?' 'I will tell you,' quoth she, 'and tell you a truth which, perchance, ye will marvel at. One of the greatest benefits that God ever gave me, is, that he sent me so sharp and severe parents, and so gentle a schoolmaster. For when I am in presence either of father or mother, whether I speak, keep silence, sit, stand, or go, eat, drink, be merry or sad, be sewing, playing, dancing, or doing any thing else, I must do it, as it were, in such weight, measure, and number, even so perfectly as God made the world, or else I am so sharply taunted, so cruelly threatened, yea, presently, sometimes with pinches, nips, and bobs, and other ways, which I will not name for the honour I bear them, so without measure misordered, that I think myself in hell, till time come that I must go to Mr. Elmer; who teacheth me so gently, so pleasantly, with such fair allurements to learning, that I think all the time nothing, whiles I am with him. And when I am called from him, I fall on weeping, because, whatever I do else, but learning, is full of grief, trouble, fear, and whole misliking unto me. And thus my book hath been so much my pleasure, and bringeth daily to me more pleasure and more, that in respect of it, all other pleasures, in very deed, be but trifles and troubles unto me.'

"Learning teacheth more in one year than experience in twenty; and learning teacheth safely when experience maketh mo miserable than wise. He hazardeth sore that waxeth wise by experience. An unhappy master he is, that is made cunning by many shipwrecks; a miserable merchant that is neither rich nor wise but after some bankrouts. It is costly wisdom that is bought by experience. We know by experience itself, that it is a marvelous pain, to find out but a short way

by long wandering. And surely, he that would prove wise by experience, he may be witty indeed, but even like a swift runner, that runnest fast out of his way, and upon the night, he knoweth not whither. And verily they be fewest in number that be happy or wise by unlearned experience. And look well upon the former life of those few, whether your example be old or young, who without learning have gathered, by long experience a little wisdom, and some happiness; and when you do consider what mischief they have committed, what dangers they have escaped (and yet twenty for one do perish in the adventure), then think well with yourself, whether ye would that your own son should come to wisdom and happiness by the way of such experience or no.

"It is a notable tale, that old Sir Roger Chamloe, sometime chief justice, would tell of himself. When he was Ancient in inn of court, certain young gentlemen were brought before him to be corrected for certain misorders; and one of the lustiest said, 'Sir, we be young gentlemen; and wise men before us have proved all fashions, and yet those have done full well.' This they said, because it was well known, Sir Roger had been a good fellow in his youth. But he answered them very wisely. 'Indeed,' saith he, 'in youth I was as you are now: and I had twelve fellows like unto myself, but not one of them came to a good end. And therefore, follow not my example in youth, but follow my counsel in age, if ever ye think to come to this place, or to these years, that I am come unto; less ye meet either with poverty or Tyburn in the way.'

"Thus, experience of all fashions in youth, being in proof always dangerous, in issue seldom lucky, is a way indeed to overmuch knowledge; yet used commonly of such men, which be either carried by some curious affection of mind, or by some hard necessity of life, to hazard the trial of overmany perilous adventures.

"[In favor of the learning of more languages than one]—'I have been a looker on in the cockpit of learning these many years; and one cock only have I known, which, with one wing, even at this day, doth pass all other, in mine opinion, that ever I saw in any pit in England, though they had two wings. Yet nevertheless, to fly well with one wing, to run fast with one leg, be rather rare masteries, much to be marvelled at, than sure examples, safely to be followed. A bishop that now liveth a good man, whose judgment in religion I better like, than his opinion in perfectness in other learning, said once unto me; 'We have no need now of the Greek tongue, when all things be translated into Latin.' But the good man understood not, that even the best translation, is for mere necessity but an evil imped wing to fly withal, or a heavy stump leg of wood to go withal. Such, the higher they fly, the sooner they falter and fail: the faster they run the oftener they stumble and sorer they fall. Such as will needs so fly, may fly at a pye and catch a daw: and such runners, as commonly they, shove and shoulder, to stand foremost, yet in the end they come behind others, and deserve but the hopshackles, if the masters of the game be right judgers.

"* * * *Philologus.*—How much in this matter is to be given to the authority of Aristotle or Tully, I cannot tell, seeing sad men may well enough speak merrily for a mere matter; this I am sure, which thing this fair wheat (God save it)

maketh me remember, that those husbandmen which rise earliest, and come latest home, and are content to have their dinner and other drinkings brought into the field to them, for fear of losing of time, have fatter barns in the harvest, than they which will either sleep at noontime of the day, or else make merry with their neighbours at the ale. And so a scholar, that purposeth to be a good husband, and desireth to reap and enjoy much fruit of learning, must till and sow thereafter. Our best seed time, which be scholars, as it is very timely, and when we be young; so it endureth not overlong, and therefore it may not be let slip one hour; our ground is very hard and full of weeds, our horse wherewith we be drawn very wild, as Plato saith. And infinite other mo lets, which will make a thrifty scholar take heed how he spendeth his time in sport and play. *Toxophilus.*—That Aristotle and Tully spake earnestly, and as they thought, the earnest matter which they entreat upon, doth plainly prove. And as for your husbandry, it was more probably told with apt words, proper to the thing, than thoroughly proved with reasons belonging to our matter. For, contrarywise, I heard myself a good husband at his book once say, that to omit study for some time of the day, and some time of the year, made as much for the increase of learning, as to let the land lie sometime fallow, maketh for the better increase of corn. This we see, if the land be ploughed every year, the corn cometh thin up; the ear is short, the grain is small, and when it is brought into the barn and threshed, giveth very evil faule. So those which never leave poring on their books, have oftentimes as thin invention, as other poor men have, and as small wit and weight in it as in other men's. And thus your husbandry, methink, is more like the life of a covetous snudge, that oft very evil proves, than the labour of a good husband, that knoweth well what he doth. And surely the best wits to learning must needs have much recreation, and ceasing from their book, or else they mar themselves; when base and dumpish wits can never be hurt with continual study; as ye see in luting, that a treble minikin string must always be let down, but at such time as when a man must needs play, when the base and dull string needeth never to be moved out of his place. The same reason I find true in two bows that I have, whereof the one is quick of cast, trig and trim, both for pleasure and profit; the other is a lugge slow of cast, following the string, more sure for to last than pleasant for to use. Now, Sir, it chanced the other night, one in my chamber must needs bend them to prove their strength, but (I cannot tell how) they were both left bent till the next day after dinner; and when I came to them, purposing to have gone on shooting, I found my good bough clean cast on one side, and as weak as water, that surely, if I were a rich man, I had rather have spent a crown; and as for my lugge, it was not one whit the worse, but shot by and by as well and as far as ever it did. And even so, I am sure that good wits, except they be let down like a treble string, and unbent like a good casting bough, they will never last and be able to continue in study. And I know where I speak this, Philoge, for I would not say thus much afore young men, for they will take soon occasion to study litle enough. But I say it, therefore, because I know, as little study getteth little learning, or none at all, so the most study getteth not the most learning of all. For a man's wit, fore-occupied in earnest study, must be as well recreated

with some honest pastime, as the body, fore-laboured, must be refreshed with sleep and quietness, or else it cannot endure very long, as the noble poet saith:

'What thing wants quiet and merry rest, endureth but a small while.'

"To see the wind with a man's eyes, it is impossible, the nature of it is so fine and subtle; yet this experience of the wind had I once myself, and that was in the great snow which fell four years ago. I rode in the high way betwixt Topcliff upon Swale and Boroughbridge, the way being somewhat trodden afore by wayfaring men; the fields on both sides were plain, and lay almost yard deep with snow; the night before had been a little frost, so that the snow was hard and crusted above; that morning the sun shone bright and clear, the wind was whistling aloft, and sharp, according to the time of the year; the snow in the highway lay loose and trodden with horse feet; so as the wind blew, it took the loose snow with it, and made it so slide upon the snow in the field, which was hard and crusted by reason of the frost overnight, that thereby I might see very well the whole nature of the wind as it blew that day. And I had a great delight and pleasure to mark it, which maketh me now far better to remember it. Sometime the wind would be not past two yards broad, and so it would carry the snow as far as I could see. Another time the snow would blow over half the field at once. Sometime the snow would tumble softly, bye and bye it would fly wonderful fast. And this I perceived also, that the wind goeth by streams and not whole together. For I should see one stream within a score on me, then the space of two score, no snow would stir, but, after so much quantity of ground, another stream of snow, at the same very time, should be carried likewise, but not equally; for the one would stand still, when the other flew apace, and so continue sometime swiftlier, sometime slowlier, sometime broader, sometime narrower, as far as I could see. Now it flew not straight, but sometime it crooked this way, sometime that way, and sometime it ran round about in a compass. And sometime the snow would be lift clean from the ground up to the air, and bye and bye it would be all clapt to the ground, as though there had been no wind at all; straightway it would rise and fly again. And that which was the most marvel of all, at one time two drifts of snow flew, the one out of the west into the east, the other out of the north into the east. And I saw two winds, by reason of the snow, the one cross over the other, as it had been two highways. And again, I should hear the wind blow in the air, when nothing was stirred at the ground. And when all was still where I rode, not very far from me the snow should be lifted wonderfully. This experience made me more marvel at the nature of the wind, than it made me cunning in the knowledge of the wind; but yet thereby I learned perfectly that it is no marvel at all, though men in wind lose their length in shooting, seeing so many ways the wind is so variable in blowing.

"If men would go about matters which they should do, and be fit for, and not such things which wilfully they desire, and yet be unfit for, verily greater matters in the commonwealth than shooting should be in better case than they be. This ignorance in men which know not for what time, and to what thing they be fit, causeth some wish to be rich, for whom it were better a great deal to be poor;

other to be meddling in every man's matter, for whom it were more honesty to be quiet and still; some to desire to be in the court, which be born and be fitter rather for the cart; some to be masters and rule other, which never yet began to rule themselves; some always to jangle and talk, which rather should hear and keep silence; some to teach, which rather should learn; some to be priests which were fitter to be clerks. And this perverse judgment of the world, when men measure themselves amiss, bringeth much disorder and great unseemliness to the whole body of the commonwealth, as if a man should wear his hose upon his head, or a woman go with a sword and a buckler, every man would take it as a great uncomeliness, although it be but a trifle in respect of the other.

"This perverse judgement of men hindereth nothing so much as learning, because commonly those that be unfittest for learning, be chiefly set to learning. As if a man now-a-days have two sons, the one impotent, weak, sickly, lisping, stuttering, and stammering, or having any mis-shape in his body; what doth the father of such one commonly say? This boy is fit for nothing else, but to set to learning and make a priest of, as who would say, the outcasts of the world, having neither countenance, tongue, nor wit (for of a perverse body cometh commonly a perverse mind,) be good enough to make those men of, which shall be appointed to preach God's holy word, and minister his blessed sacraments, besides other most weighty matters in the commonwealth; put oft times, and worthily, to learned men's discretion and charge; when rather such an office so high in dignity, so goodly in administration, should be committed to no man, which should not have a countenance full of comeliness, to allure good men, a body full of manly authority to fear ill men, a wit apt for all learning, with tongue and voice able to persuade all men. And although few such men as these can be found in a commonwealth, yet surely a goodly disposed man will both in his mind think fit, and with all his study labour to get such men as I speak of, or rather better, if better can be gotten, for such an high administration, which is most properly appointed to God's own matters and businesses.

"This perverse judgment of fathers, as concerning the fitness and unfitness of their children, causeth the commonwealth have many unfit ministers: and seeing that ministers be, as man would say, instruments wherewith the commonwealth doth work all her matters withal, I marvel how it chanceth that a poor shoemaker hath so much wit, that he will prepare no instrument for his science, neither knife, nor awl, nor nothing else, which is not very fit for him. The commonwealth can be content to take at a father's hand the riffraff of the world, to make those instruments of wherewithal she should work the highest matters under heaven. And surely an awl of lead is not so unprofitable in a shoemaker's shop as an unfit minister made of gross metal is unseemly in the commonwealth.—Fathers in old time, among the noble Persians, might not do with their children as they thought good, but as the judgment of the commonwealth always thought best. This fault of fathers bringeth many a blot with it, to the great deformity of the commonwealth; and here surely I can praise gentlewomen, which have always at hand their glasses, to see if any thing be amiss, and so will amend it; yet the commonwealth, having the glass of knowledge in every man's

hand, doth see such uncomeliness in it, and yet winketh at it. This fault, and many such like, might be soon wiped a way, if fathers would bestow their children always on that thing, whereunto nature hath ordained them most apt and fit. For if youth be grafted straight and not awry, the whole commonwealth will flourish thereafter. When this is done, then must every man begin to be more ready to amend himself, than to check another, measuring their matters with that wise proverb of Apollo, Know thyself: that is to say, learn to know what thou art able, fit, and apt unto, and follow that."

Geographical Pronunciation.

The following judicious, and in many respects, excellent Report from a Committee on the subject of Geographical Pronunciation, was presented by Mr. R. L Cooke, to the New Jersey Society of Teachers, and Friends of Education, in December last. The Report is probably as full as the occasion would justify, and treats rather of the principles involved in fixing upon a uniform orthoepical standard, than any exemplification of the Babel-like confusion that now prevails with regard to large classes of Geographical proper names. It would be of excellent service to teachers, and to the public in general, if some well qualified person would write out and publish a catalogue of names that are variably pronounced, applying, if possible, the corrections that tend to uniformity.—*Editor.*

It is surprising that the subject of geographical pronunciation should hitherto have received so little attention from teachers and practical men. Whoever has attempted to teach geography, even in its primary departments, must have been painfully sensible of a deficiency in this respect, that ought to be supplied;—a deficiency that increases, and becomes more embarrassing, as we leave the boundaries of Saxondom. It is doubtful whether there

are two schools in the United States, in which geographical names are pronounced alike; indeed it would probably be difficult to find even one school, in which any *system* of pronunciation is adopted, or if adopted, is adhered to with any degree of strictness. While some, with national pertinacity, adhere to a pronunciation that is purely English, others, more ambitious, aim at sounds that are supposed to be correct, inversely as they differ from those which ordinarily greet our ears.

The confusion resulting from such latitude, has increased within a few years, from the ill-judged, and often ludicrous attempts of some modern geography-makers, to indicate by means of English letters, in a few isolated cases only, the pronunciation of foreign names, without affording to the learner any hint that will enable him to profit by the information thus conveyed, in its application to other words. The magnitude of the evil becomes daily more apparent, as our intercourse with distant quarters of the globe extends, and the names of places recently unknown, or to us unimportant, become familiar to the eye, if not to the ear. Who of us while reading to an attentive audience, some account of the movements of our army in Mexico, has not been annoyed, perhaps mortified, at the constant recurrence of Mexican names, which, through ignorance of Spanish orthoepy, it was impossible for us to pronounce correctly, while we were unwilling to expose that ignorance by pronouncing it according to the rules of our own language?

What is to be done in such a case as this? How ought the mere English scholar,—and he is the representative of at least nine-tenths of the community,—to pronounce the names of those places and countries, with whose language he has no acquaintance? Or to bring the question nearer home, how ought common school teachers, and common school children to be taught to pronounce geographical terms, so as to produce, at least, as much uniformity as is attained in the pronunciation of ordinary English words? The consideration of this question is the object of this report, and in discussing it, I propose to inquire whether it would be most desirable to adopt the foreign pronunciation of foreign

names, applying to them the rules of orthoepy in their respective languages, or to follow the rules of our own tongue, giving to every letter its proper English sound.

There has recently been published in the city of Philadelphia, a work, entitled "A Universal Pronouncing Gazetteer," the *specific* object of which, while it introduces much other valuable matter, is to throw light upon this subject, and to propose a uniform system of pronunciation. In the prosecution of this design, the author announces his determination "to give the pronunciation of all geographical names, as nearly as possible, as they are pronounced by the well-educated people of the respective countries to which they belong, with the exception of those well-known foreign names, which appear to have acquired a fixed English pronunciation, Paris, Naples, &c." As far as our knowledge extends, this is the first labored attempt to establish, and practically carry out, the principle that all foreign names should be pronounced according to the rules of orthoepy in their respective languages, and as the author has devoted a large space in his preface to a defence of his position, a brief review of his arguments will afford an opportunity for the expression of our views upon the subject.

The first plea put forth in this behalf, by our author, is the usage of our distinguished poets, who have exhibited great accuracy, amounting almost to fastidiousness, in the accentuation of foreign names, and the numerous examples adduced, seem to make a strong case, and to warrant his deductions. A reference to these examples, however, will show that the names introduced are in most instances those whose foreign pronunciation has been adopted by almost universal consent, and thus has become Anglicised; and consequently those writers who have introduced them correctly into their verses, deserve no more credit than one who should make Naples rhyme with *staples*, or Bourdeaux rhyme with *row*. These writers accentuated such words as *Genoa* and Gran*a*da, according to foreign pronunciation, precisely upon the same principle that would lead them to grace the termination of one line with "ladies," when it was intended to rhyme with

"*Cadiz,*" though in the latter instance, the accentuation and pronunciation are purely English.

In illustration of this remark, let us take one or two examples from a popular poet, who has been introduced by the author of the Gazetteer, as a witness, in his favor.

> "* * * * Sure there never was hero so civil—he
> Saw us safe home, 'tis one door in Rue Rivoli." MOORE.

In this instance, the poet has given very *nearly*, though not exactly, the foreign pronunciation of the word "Rivoli," and might properly be quoted as authority in favor of foreign pronunciation, but for the important fact, that such is the ordinary pronunciation of good English speakers, and it is worthy of remark that the pronunciation of the poet varies from the true native orthoepy, in precisely the same particulars as is observable in conversation.

Again:

> "In the pathetic mode of Isfahan,
> Touch'd a preluding strain, and thus began." MOORE.

We have here the genuine flat English sound of "*an,*" in the final syllable of the ancient Persian capital, rhyming with the word "*began,*" and we readily give our assent to its correctness, because we have so heard it pronounced from the days of our earliest boyhood, and any other pronunciation would offend our ears.

Thus we see that Moore adapts his pronunciation, not to the "usage of the well-educated" in the countries, whose names he introduces, "but to the usage that most extensively prevails in our own land; and as an evidence that he is not always consistent with himself, we quote two stanzas, in which the pronunciation of the same name is materially varied.

> "Yet dim before *her* were the smiles of them all;
> And the light of his harem, was young Nourma*hall*."
>
> "Hence it is too, that Nourma*hall*,
> Amid the luxuries of that hour,
> Far from the joyous festi*val*,
> Sits in her own sequestered bower."

Lord Byron is highly complimented by our author, for his

punctilious observance of foreign pronunciation, in the use of foreign names, yet he is sometimes "found napping," as in the following instance, when the accentuation is foreign, while the pronunciation is English:

> "Spain, which a moment mindless of the *Cid*,
> Beheld his banner flouting thy *Madrid*."

The next argument adduced in favor of adopting the foreign pronunciation of geographical terms, is the alleged fact, that "there is at least a tendency" towards such a course in such standard works as have paid any attention to the subject. The Edinburgh Compendium of Geography is particularly mentioned as an illustration of the remark, but it is rather curious that while the work is highly praised, notwithstanding "it contains some errors," a note informs us that "these errors are wholly confined to pronunciation!" In this connexion, it would be unfair not to refer to the copious vocabularies of geographical names, appended to the last editions of Webster's and Wooster's Dictionaries, where foreign pronunciations are extensively given. Of the former, I am not able to speak with confidence, not having at hand the right edition,—but a short extract from the remarks prefacing the vocabulary of the latter, will show that the "tendency" of this work towards an exclusively foreign pronunciation, is by no means as strong as many have been led to suppose. "A person conversant with foreign languages, will be likely to pronounce such words, as have not become established by common usage," in the foreign manner, while a mere English scholar may be naturally expected, and *permitted* to incline more strongly to the English mode. It may be often desirable to know what the native mode of pronouncing such words is, *though it may not be advisable in common use to adopt it.*" So doubtful is the author of the vocabulary of its "tendency," as regards the question of native or English pronunciation, that he adds, in concluding his remarks, the advocates of both plans "may make out a plausible case in favour of their respective views."

If the preceding remarks are just, it is manifest after all, that the prevailing pronunciation of any word is the one that generally is, and ought to be, adopted; but then arises at once a practical

difficulty, that the author of the Gazetteer is compelled to admit,—to determine what foreign names *are*, and what are not, well known and established by common usage. With regard to a very large class of names, such as *France, Paris, Mexico,* &c., there can be no doubt; they are undeniably pronounced according to English orthoepy;—and also with regard to another large class, there is no uncertainty, because they have been too little known, and too little used, to have acquired any fixed pronunciation; but of a third class, it is by no means so easy to speak decidedly, and this class is rapidly increasing in numbers. There is such a diversity of usage, and difference of opinion in respect to them, among those who are considered authorities, that each one is compelled to decide for himself, and adopt that pronunciation which seems most desirable.

Doubtless this diversity of usage has gradually arisen from the fact, that when the names in question were first introduced into our geographical vocabulary, they were immediately Anglicised, and in that form extensively used by our unsophisticated forefathers; but in process of time, some more learned, or more pedantic than their neighbors, suggested that it would be quite as improper to receive a foreign lackey into our service, without his livery, as to admit a foreign word into our language, without being clothed in its appropriate costume;—and as many admitted the force of the argument, and acted accordingly, we now find the community, in many cases, divided against itself. This is emphatically a progressive age; and progression is not more characteristic of our political Republic, than of the republic of letters. Old things no longer satisfy;—there is a restless tendency to make all things new. Hence every innovation, or odd, conceit is sure to find sufficient advocates, to introduce confusion, at least, if not to set the seal of public approbation upon it, and bring it within the pale of recognized authorities.

Enough probably has been said to give a fair idea of the principal arguments adduced in favor of adopting the foreign pronunciation of foreign names, even if our limits would permit extension; we must therefore devote the remainder of the time that

is allotted us, to a consideration of some of the difficulties that occur in the execution of the plan.

The first difficulty to which we allude, is the frequent impossibility of indicating foreign sounds by any letters, because there are no sounds, or combinations in our language, analogous to them. A single instance, in illustration, will suffice. In the Spanish and Danish languages, the letter D, when it commences a word, is sounded very much as in English, but when it occurs at the end of a word, or between two vowels, its articulation can be effected only by placing the tip of the tongue against the upper teeth, and gently forcing out the breath. The sound of *th*, in "that" comes nearer to it, than any other combination in our language, yet we cannot indicate the true Spanish sound of D, by the use of those letters, because they are themselves so differently pronounced, when differently combined with other letters.

The Spanish pronunciation, therefore, of such names as Madrid, Trinidad, &c., can be expressed only by arbitrary signs, that may perchance be as difficult to decipher, or apply, as the original letters themselves, which they were designed to illustrate. This difficulty rapidly increases as we go beyond the boundaries of those countries whose languages are more or less intimately connected with our own, by the ties of consanguinity, until it seems to become absolutely insurmountable, and so sensible is the author of the Gazetteer of this, that he makes the following remarkable concession: "It should be observed," he says, "that though we have endeavored to give the native pronunciation of the names of other countries, with minute accuracy, yet in accordance with the advice of a number of our most intelligent and judicious friends, we have been careful to avoid as much as possible, on all occasions, the use of sounds which cannot be readily uttered by the mere English scholar, more especially in the pronunciation of those geographical names which are taught in schools."

Those who advocate the adoption of a system of foreign pronunciation, claim as its chief, its crowning excellence, that it will introduce uniformity into our geographical orthoepy, while they denounce an exclusive English pronunciation, as tending to endless

confusion. But is this so? Is there any more probability that an English scholar will utter correctly those *foreign sounds* which are indicated by English letters, than that he will correctly articulate the *English sounds* that may be indicated by the same letters? Would it be possible for any ten teachers, selected promiscuously, each to read with similar accentuation and pronunciation, the same page of geographical names, though accurately marked with all the signs of peculiar sounds, that human ingenuity can invent? To a native of the lands whence that catalogue of names was taken, would not the pronunciation of every one of those teachers seem to be an egregious caricature of his own tongue, and if it did not awaken his ire, would it not excite his ridicule and contempt? In short, would they not all wander as far from the true native pronunciation of the words, as if they had uttered them in good broad English?

It cannot be denied, but that great diversity of opinion and pronunciation would exist, if all foreign words were to be pronounced according to the principles of English orthoephy, yet doubtless not greater than would result from the other plan, and not greater than now actually exists in the pronunciation of English and American names. In the former case, moreover, we have at hand the means of correcting errors, which could not be readily done in the latter.

The conclusion, then, to which we would come, in view of the whole subject, is, that the native pronunciation of such foreign names only, should be adhered to, as has been extensively adopted by good speakers, while that of all others should be made to conform to the orthoepy of our own language, so far at least, as it can be made applicable to them.

Education in France.

In the schools of France, there are three kinds of instruction; and they are denominated primary, secondary and superior. The primary instruction includes only those branches which are deemed indispensable; such as reading, writing and arithmetic. The secondary instruction comprises Latin, Greek, history, geography, rhetoric, philosophy, elementary mathematics, physics, chemistry and natural history. It is necessary to have studied these branches, in order to obtain the degree of *bachelier-es-lettres*, which degree is a required preliminary to the obtaining admission to the faculties of the learned professions. Without first having received the degree, a young gentleman is not admitted as a student for the profession of an advocate, a physician, a graduate in theology, or a professor in letters or science. This degree is a baccalaureate certificate that the course of secondary instruction has been gone through with, qualifying and authorising the individuals to pass on to the superior instruction. This course of secondary instruction is given in five kinds of seminaries, royal colleges, communal colleges, private colleges, institutions, boarding schools (*pensions*). The royal colleges are supported by the government, and are three in number. The communal colleges are supported by the communes, or towns, and are numerous; there being between 300 and 400 of them. They are not all, however, *de plien exercice;* that is, they do not all give instruction in all the branches required for the degree of *bachelier-es-lettres.*

The private colleges are, as their name implies, supported by private funds of their pupils; their professors must have the same qualifications as in the royal colleges, and they are privileged to confer degrees. There are but two of these, both in Paris.

The institutions are also private seminaries, founded under the sanction of the university. The principal must be a bachelor of sciences and letters, but the assistant teachers are not required to have degrees, and the students of these seminaries obtain degrees, if at all, from the royal colleges.

The *pensions*, boarding-schools, are private institutions, and the student may pursue the first years of his classical course in a

pension, but he must finish elsewhere, in order to obtain a degree. The number of these in France is about 1400; and the whole number of students in these five grades of seminaries, who are receiving secondary instruction, is probably 60,000.

There are also in France large numbers of youths, who are destined for commerce, for the arts, and for other pursuits not generally called professional, to whom their parents wish to give a different course of instruction from that prescribed in the colleges. For these, the study of the ancient languages is of less importance than an acquaintance with those branches of knowledge, which are more particularly adapted to their future occupations. The wants of a numerous and respectable portion of the people demanded this change in, or rather addition to, the course of instruction. The university, so far from encouraging this innovation, openly opposed it, and claimed the continuance of all the privileges transmitted by the empire, to the government of 1814. The course of study prescribed to the secondary schools, it was contended, did not allow of this change, because it interfered with the long-enjoyed and prescriptive immunities of the colleges, to deviate from the marked out course, so far as to introduce matters pertaining to commerce, the arts and other pursuits, not professional. This defect in the system of education it was not easy to overcome, on account of the conflicting interests of the different grades of seminaries, all desirous of patronage. The contest on this subject was often sharp and exciting; the innovators evidently having the best of the argument, until 1829, when, by way of compromise, their object was partially accomplished, by establishing in the royal, and in several of the communal colleges, a separate course for those designed for commerce and other pursuits, and by authorising the principals of institutions and *pensions*, to form classes that should be exempted from attendance upon the course of the college. Thus the enterprise of the people has united with the government, in obtaining access to a course of instruction adapted to the emergencies of the times.

There is another class of schools that belongs to the church organization. When the Roman Catholic worship was re-estab-

lished in France, seminaries for theological studies were founded in every diocese. These were denominated ecclesiastical secondary schools, or little seminaries, under an *ordonnance*, excluding lay youths from them. But the clergy, under whose exclusive guidance they are, have so far evaded this restriction, that the lay pupils have become more numerous than the ecclesiastical, and the clergy, whose object is to keep in their hands the education of youth, have gone so far in evasion of this restrictive regulation, as to establish eight Jesuits' colleges, which are patronised principally by lay pupils.

Other seminaries pay a heavy tax to the university. These were excused from the payment of the tax, because they were ecclesiastical. This privilege given to the clergy was abused by their receiving lay students, and evading the university tax. The ordinary schools were overborne in the competition, and instead of danger and oppression from the university monopoly that had been much complained of, the danger seemed to be rather of the clerical monopoly, in contravention of the guards in their charter. The government, which had been willing to bestow a boon to favor the clerical orders, adjudged this practice to be an invasion of their rights, forbad individuals, of societies not authorised by law in France, to keep schools, and promulgated more stringent regulations against lay pupils being received into ecclesiastical schools, and limiting the number of pupils in schools of this cast, to twenty thousand. So, it appears, there are in these secondary colleges and schools, something over seventy thousand youths of France, receiving classical instruction, twenty thousand of whom are destined for the church.

The foregoing narrative presents an imperfect outline of instruction up to a recent date. The right to establish private schools of a high grade is now, to a considerable extent, claimed; but those who institute private seminaries are bound to furnish the proper authorities with proof of their capability, and thus a professor may become director of a private college, or master of a private college, or master of a *pension*, just as a man in the United States, becomes a lawyer, or a physician, by furnishing proof, in the proper place, of his character and abilities. It was an arbi-

trary requisition which forced private teachers to attend college classes, or to conform their course of study to the prescription of the higher institution. Exempted from this, students choose rather to adapt their studies to their intended destinations in life. Schools and colleges thus rescued from antiquated absurdities, and teaching freed from unnecessary restraints, a wholesome rivalry would spring up in the schools, and a system of education, better suited for the age we live in, would soon develope itself. The government, the communes and individuals might still have their respective schools, and a commendable emulation might be excited among them, that would tend to their improvement. School officers, who should be bound to report annually to the minister of public instruction, should visit them, not to dictate in the instructions, but to see that the health and morals of the scholars were not neglected.

We come now to give some account of the *superior* instruction given in schools, called *Faculties.* The five distinct kinds of faculties established in France, are not together, as in the German and some other universities, but each faculty is complete in itself, conferring its appropriate degrees, but is nevertheless a constituent part of the University of France. There are faculties of theology, law, medicine, science and letters. In each of these there are given, as the candidates are prepared, three degrees, those of bachelor, licentiate and doctor. These degrees are obtained in succession, after examinations and public theses. A student, in no case, can obtain a degree in any of these, without first having become bachelor in letters.

There are in France six faculties of the Roman Catholic theology. They are at Paris, Lyons, Aix, Bourdeaux, Rouen and Toulouse; none of these has a large number of students, and it is not common to confer degrees. The canons made degrees necessary for the high functionaries of the church. These canons, though not formally abrogated, have fallen into disuse; and, in recent years, bishops have been appointed, upon a dispensation from Rome, instead of licentiate degree.

There are two faculties of Protestant theology, one at Strasbourg, and one at Montaubon. both pretty well attended.

The faculties of law are nine. They are at Paris, Aix, Caen, Dijon, Grenoble, Poitiers, Rouen, Strasbourg, Toulouse. In all these they teach the Institutes of the Justinian and civil codes, and the methods of judicial proceedings. In some of these schools there is also a chair of the commercial code, of the *droit administratif*, and of the pandects. To obtain the degree of bachelor, a student must attend *two* years, one year more he is a licentiate, and one year again, he receives the degree of doctor. Students must have attended with regularity the prescribed time, and also produce certificates of character and diligence, in order to be admitted to examination and theses. Before practising, it is indispensable that the candidate shall have received the degree of licentiate; and the degree of doctor is necessary before one can fill a professor's chair.

There are three faculties of medicine at Paris, Montpellier and Strasbourg. The profession of the healing art is divided into two distinct grades, known as doctors of medicine or surgery and *officers de santé*. To be admitted to the degree of doctor, a person must have studied four years in a faculty of medicine, undergone five examinations in the different departments of the profession, and have written an approved thesis. To become an *officier de santé*, it is not necessary to have studied in a faculty. The candidate may study elsewhere, and be examined by a medical jury, which must consist of two doctors of the department, and one appointed by the faculties. To be qualified as an *officier de santé*, the candidate must have studied with a doctor six years, been in a hospital five years, or have been in a secondary school of medicine three years. Of those secondary schools which are not allowed to confer degrees, there are eighteen, and there are four schools of pharmacy.

The faculties of science are seven in number. In these are generally professorships in mathematics, natural history, physics, astronomy, mineralogy, zoology and botany; and in the schools of Paris, separate professors for the differential and integral calculus, vegetable physiology, &c.

There are six faculties in letters; they differ considerably in their courses, but generally have chairs of history, of Latin, Greek and

French literature, of oriental and foreign literature, poetry and eloquence; and of philosophy, geography, ethnography, &c.

Students in the faculties of science and letters, must be graduates from the royal or communal colleges, which are *de plien exercice.*

The other schools of *superior* instruction, which stand most prominent, are the college of France, the museum of natural history, the school for living oriental languages, and the special school of the fine arts.

Under the imperial government, there were two very noted schools of *superior* instruction, known as the *Polytechnique* and the Normal schools. The *Polytechnique* was what the name implies. It was renowned for the diversity of and amplitude of its means of instruction, especially in civil and military affairs. Its history is, however, known in this country and in Europe. The Normal school was designed to qualify professors for the royal and communal colleges. It was established by a decree of Napoleon in 1808, for the purpose of completing the organization of the university of France. In 1821, this school was suddenly suppressed, under pretext of disaffection towards the restored monarchy. This *mauvais esprit* in this corps of literati, was the result, no doubt, of love for the free charter granted to them by Napoleon. It was a crime in the estimation of the restored dynasty, to unite the love of letters with the love of liberty. The *theocratic* party urged the destruction of this school, in order to stop the supply of professors to the colleges, who were often in direct antagonism with the ecclesiastics on many of the topics of education. The church party apparently succeeded in their designs upon the Normal School. While the friends of this school appeared to yield to the clamor and opposition to their favorite organization, for the education of professors, they virtually succeeded in saving it from utter extinction under the name of the Preparatory School. After the ever-memorable events of the *trois jours* in 1830, it again resumed the original name, Normal School. Pupils are the successful competitors on an examination. The number of pupils is limited to fifty or sixty, and there is in the school a department for science and one for letters. The term of study is three years, after

which the graduates are competent for professors in the communal colleges.

There are besides this high central Normal School, many others intended for the education of masters of primary instruction. In 1840, there were eighty-three of these seminaries in operation. The law of France recognizes *teaching* as a science, and declares, "*that no schoolmaster shall be appointed, who has not himself been a pupil of the school which instructs in the art and science of teaching.*"

There are various other kinds of schools established for special objects, some of them by the sanction and support of the government, others are supported either by munificent individuals or corporate societies, such as the school for arts and trades. The free school of mathematics and drawing; royal school for singing and declamation; and veterinary and agricultural schools. The University of France is composed of the minister of instruction, councillors of the university, inspectors of academies and the whole body of teachers.

The minister of public instruction, exercises administrative functions generally, and, with the advice of the council, performs minor disciplinary offices, but cannot expel a member without a hearing before the council, the members of which council are appointed for life, like other judicial officers of the country.

The teachers of primary instruction are of three grades, and receive a certificate of competency (*brevet de capacité*) from the rector of an academy; this is carried to the bishop of the diocese, who certifies to the orthodoxy and qualification of the candidate, and the rector grants a qualified licence, which is good only for the diocese for which it is given. The rector also has power to recall this licence, leaving however to the teacher the privilege of appeal to the minister of instruction. Notwithstanding the amplitude of means and appliances for superior and secondary instruction in France, there is great deficiency in some of the departments, of the means of good primary schools, which we propose to make the subject of a paper in our second number.

Infant Schools.

THERE is a proneness, both in this country and in England, when a new idea, a new invention or speculation, is started, to drive it beyond the point where its usefulness ceases. In this way many very good things are made bad. Infant schools were originated for poor people, who could not well stay at home and take care of their children. The infant school was benevolently established as a house of detention, a place of deposit for the little urchins, to keep them out of harm's way, and teach them something useful, while the parent was at some employment earning their bread. It was a substitute for maternal care and instruction; but where she is capable of teaching, there is no instruction like the mother's. Individuals, who voluntarily assume the responsibilities of the family relation, should not devolve the task of unfolding and forming the minds of their *very young* children upon others, who from the necessity of the case, must do it in a kind of wholesale way—the little immortal has, perhaps some peculiarity that is best known at home—some frailty that wants correcting—some virtue that wants encouraging, that is all unknown at school. Is it not cruelty to turn it out to Procrustes, to be gauged to his uniform standard? "All great things," says Coleridge, "that have been achieved in the world, have been achieved by individuals, working from the instinct of genius and goodness. The rage now-a-days is all the other way; the individual is supposed capable of nothing; there must be organization, classification, machinery, &c., as if the capital of national morality could be increased by making a joint stock of it. Hence you see those infant schools so patronized by the bishops and others, who think them a grand invention. Is it found that an infant school child who has been bawling all day a column of the multiplication-table, or a verse from a ballad, grows up a more dutiful son or daughter? Are domestic charities on the increase amongst families under this system? In a great town, under our present state of society, perhaps such schools may be a justifiable expedient, a choice of the less evil—but as for driving these establishments

into the country villages, and breaking up the cottage home education, we think it one of the most miserable mistakes which the well intentioned people of the day have yet made."—These thoughts may appear antiquated, and perhaps puritanical, to some who have neither time nor inclination to teach their *own little children*, but they are nevertheless true to the letter. Time and experience concur in establishing their verity. The mother's instructions are remembered; they are the elements of future character, and are woven into the "warp of life," and may not with impunity be dispensed with. It is not our purpose in these remarks to undervalue the infant school, so long as it is confined to its legitimate sphere of usefulness;—but we solemnly protest against parents only half performing their parental duties,—and that *half* performed by proxy.

Thoughts on Music.

Every nation has its music, in some form or other. The Siberian sings to his idol god. The Chinese always have music at their weddings. The Laplander sings, as he glides over the snow. The Scotch pipes cheer the workmen, as they gather their crops. The Greenlander celebrates the return of day with music. The Greek bids his home and friends farewell, in a plaintive song. The Icelander and Tartarian have their crude instruments and songs. Even the cannibals of New Zealand are fond of music.

Horace calls music a friend to the temple. Maximus Tyrious calls it the companion of sacrifices. And Plato desired that none but temple music might be heard. Pliny accuses the early Christ-

ians of singing hymns to Christ as to God. Clemens Alexandricus preferred the music of the voice to the clamor of instruments. And Suidas speaks of the responsive singing of the ancients. Bishop Stillingfleet was of opinion that the early Britons received their sacred music at the time St. Paul visited that Island.

The celebrated astronomer, Herschel, John Milton, father of the poet, Frederic the Great, Addison, King Alfred, Edward the Sixth, Katherine, and her daughter Queen Mary, all bore their testimony to the happy effects of music. Henry the Eighth, while fitting for the archbishopric of Canterbury, gave his whole attention to the study of music for some years. The emperor, Charles the Fifth, acknowledged the pleasure which he received from music, and often sung with his choir.

Napoleon, notwithstanding his warlike spirit, was often affected with soft music. He established an academy of music in Paris in the early part of the revolution; and the British Government, sensible of the salutary influence of this noble art, gave two hundred and forty thousand dollars for the establishment of a similar institution. Among the directors of this national school, may be seen the names of many of the most distinguished persons connected with government.

Nero, and Charles the Ninth, were extravagantly fond of music.

Before Moscow was burnt, it contained an institution, in which about eight thousand children were daily taught to sing. Academies, for the instruction of children in singing, are now established in most christian countries. This pleasing exercise improves their minds, by quickening their sensibilities to a more delicate perception of mental as well as natural objects. The general education of children in music will soon, it is hoped, enable the churches to dispense with those theatrical bands who profane the temple, and wound the pious ear with wild flourishes and squeaks, without words or sense, to pacify the soul or cheer the heart. Queen Ann would not allow those that sung in church to sing at the theatre. Man is not the only being susceptible of musical influence. The bagpipe has been successfully employed in tolling herds of stags

from one place to another; and Professor Metoxo, of Rome, says, that in 1822, he saw a number of snakes violently agitated by the tones of an organ. Some of them attempted to escape, and others turned towards the instrument. Indeed, the principles of music seem common to all nature:—in the order and harmony of the heavenly bodies—of the four seasons—the proportions of the animal structure—the agreement of members, and the measure of melody—in the deep tones of the rolling ocean—the majestic ruin—the waving groves—and in the spirit notes of birds innumerable, which so much touch the soul, and delight and quicken the fancy.—*Anon.*

Education in the West.

It is gratifying to see the Executive Officers of the Western States calling the attention of their several Legislatures to the subject of Common School Education, as a necessary preliminary to a happier and more prosperous condition of society, than has yet been attended to in their respective States. The Governor of Illinois has the following:

"Among the great variety of subjects which lay peculiar claim to the attention of the people and their legislature, none rank higher, or are entitled to greater consideration, than that of the subject of our common schools. It addresses itself directly to every citizen of our State, from its intimate connection with the love of social, civil, and religious liberty. Some of our most valued citizens are turning their attention to the subject of common schools, with a zeal and disinterestedness worthy of high commendation: but without the assistance of the legislature, and a cheerful co-operation on the part of the people, their labors will prove comparatively weak and inefficient. It cannot reasonably be expected that in the present condition of our State, with some parts of it thinly settled, any system can be devised which will be absolutely perfect in its practical operation, or which can realize the utmost wishes of all. This inconvenience, however, is

gradually diminishing, and in a few years will, to a great extent, cease to exist. Complaints are frequent, that the township funds, in some sections of this State, are so ignorantly or wilfully mismanaged as to be of little or no benefit. If these complaints are well founded, some efficient legislative provision ought to be made to prevent such gross wrong in future."

The following is an extract from the message of Governor Edwards of Missouri:

"We have a rich soil and climate, adapted to the growth of many products, and with proper culture and favorable seasons, the husbandmen reap abundant harvests; yet it is a fact, which it is needless to attempt to disguise, that, with our soil and genial climate, and all our industry, care, and economy, we are not a prosperous and thriving people—the great mass of us are not growing in wealth, nor accumulating many of the comforts, or even the necessaries of life. The causes of this want of prosperity are various. The mass of us have not learned enough.

* * * * * * *

"The best mode of encouraging the common school, is to establish an Institution for the preparation of teachers. This can be done on a plan that will be cheap, effective, certain, and useful not only to common schools, but to every department and branch of society. If there should be any disposition on the part of the legislature to act upon this subject, the details of a plan would be cheerfully prepared and submitted. * * * *

"These disadvantages, under which the mass of our population labors, might be remedied to a great extent—1st, by encouraging the common school; 2d, by increasing the variety of our pursuits; 3d, by establishing manufactories; and 4th, by improving our roads, and navigable streams. The common school would prepare our population to apply their labor to the best advantage, to make and use the improved machinery of the age, and to avail themselves of the benefits of skill and science in all their operations. * * * *

"To increase the variety of employments in our country, it is only necessary to enlighten the people to enable them properly to consult their own interests. This cannot be done in a better mode than by fostering the common school, as the accomplishment of the object depends more upon the action of an enlightened people in their individual capacity, than upon any direct action of the legislature upon the subject. * * * * *

"But, as before observed, to manufacture very successfully, a superior population is required. This we can soon have by fostering the common school, and developing the genius and mechanical ingenuity of the youth of our country.

"The best mode of facilitating the construction of public works—McAdamized roads, railroads, and canals, if the railroad has not superseded the canal,—and the permanence of our navigable streams, is to prepare the people to appreciate the uses and advantages of such works; and this again can be done in no other mode so successfully as by sending the schoolmaster into every village and hamlet in

the land, and by giving every proper encouragement to the education of the great mass. The common school will accomplish every thing, if properly encouraged."

Governor Witcomb of Indiana, says:

"But under this comprehensive topic, there is another subject which challenges our attention by its far greater importance. I allude to the condition of our common schools Under our simple and sublime institutions, all citizens are regarded as politically equal. But to enable the citizen to protect himself in the enjoyment of his full share of political rights, he must be armed at least with an elementary education. He must know how to read and write his mother tongue. This is too frequently regarded merely as a question of expediency. But it should never be forgotten that it is a sacred DEBT, which we owe to every son and daughter of Indiana, however poor they may be, to place them upon an equality with their more favored associates, as to the means of acquiring a common school education. Until this is done, they are not as equal as they ought to be, or as we have it in our power to make them.

"By this means they will be better enabled to 'know their rights, and knowing, to maintain them" They will be better prepared to sift and analyze public questions—to scrutinize the conduct of their public officers, and hold them to a proper accountability.

"Very general dissatisfaction is expressed with our present school-law. It is objected that it is incoherent, and that its provisions are vague and conflicting. A careful revision of the entire school system is respectfully recommended.

"Great advantage would arise from the adoption into our system of such provisions, as the experience of other States has shown to be productive of happy results.

"An obvious mode of accomplishing this object, would be the appointment of a suitable person to examine unto the condition of the schools of some of the older States, by correspondence, travel, and personal inspection, and to report to a future legislature. I am informed, however, that Mr. H. F. West, a gentleman who has recently become a citizen of this place, has for several years devoted his attention to this philanthropic object, and is ready to communicate the results of his investigations. It is very probable that this will obviate the necesity of resorting to the measure above indicated, and will facilitate action on this subject.

"Whatever system you may see fit to adopt, it is recommended that provision be made for the appointment of a State superintendent, who shall be charged with the supervision of the entire school system, and particularly with procuring full and prompt reports of the condition and management of the schools and school funds in this State."

A School in Mexico.

Among the various matters communicated by the letter writers from our army in Mexico, which serve to amuse and at the same time show the character of the people, we do not think the following account of a school can very well be beat:

"On entering the town of Mier, our ears were filled by a din of strange sounds emanating from a building adjoining the church, on the plaza. We entered a long room, and there found about two hundred Mexican boys, from six to twelve years of age, in charge of a Mexican pedagogue. They were of all shades of complexion, from the Indian up to the Castilian, and their clothing varied accordingly, from *sans culottes* to ragged leather breeches, without shirts; and thence up to the ruffled shirt of the alcaid's son, who, by the way, promises fair to become as great a rascal as his father, who is said to be one of the most accomplished scoundrels in these parts. They were arranged around upon benches fixed against the walls, and were furnished with small primers. One boy walked to and fro with a riding whip in his hand, giving the mischievous urchins smart cuts over the head, feet, legs or hands, accordingly as those parts were exposed to his reach.

"During half an hour, he must have touched up at least fifty, so industriously did he apply the whip. Presently they were ordered to go through with the Paternoster, which they did at the top of their voices. The noise resembled that of a pond of frogs, of all sizes and kinds. One little rascal, in the midst of a crowd who had collected around me to admire the large brass buttons on my old hunting coat, took a sharp flint, and attempted to cut off one of them, yelling forth his prayer all the while. I caught him, and turned his back (he was one of the *sans culottes*) toward the lad with the whip, who gave him half a dozen lashes over the skin, that was well stretched, as I held his head between my knees. The pedagogue bowed to me, and said—"Muchas gracias (many thanks) Senor," and the boys were ordered to 'vamos' to their dinners."

Geography and Topography, or Blank Maps.

The Abbé Gaultier furnished a most elaborate work, some years ago in France, on the subject of teaching geography by means of blank maps. In this he was the pioneer of a great improvement, which is becoming extensively adopted in the best schools in our country. The method of indicating the situation of places by the aid of blank maps, affords an excellent test of the progress of the pupil, who is supposed to study his lessons upon a map, on which the names are all printed. He recites from a map, corresponding exactly to this, except that it is only in outline, having no names printed on it. By this method, the study is made pleasant; it becomes often amusing;—there is chance for digression. Cognate, or collateral topics, are incidentally brought in, comparisons are instituted, the reasoning faculties are brought into exercise, and the dry tirade of insignificant names is not made to burden the memory, without having the commercial advantages or disadvantages of position pointed out. *Joseph H. Mather & Co.*, of Hartford, Ct., in connection, we believe, with Mitchell, of Philadelphia, have furnished an excellent set of blank maps, that are doing good service in the diffusion of geographical knowledge in the schools of our country.

We would suggest to Mr. Mather, since he has gone so deeply into this undertaking, that he go on and complete the work according to the original design of Gaultier, which was as follows: The knowledge was impressed on the minds of the pupils by means of a game, in which many may at the same time be engaged. The first part of this published work consists of numerous questions, with their answers, which are numbered and divided into lessons. An atlas, with two sets of maps as above described, is subjoined. Boxes of counters are provided, having a question written on each counter, and a number, corresponding to that of a similar question in the book. When the pupils, after reading any particular lessons and consulting the maps, are supposed to be acquainted with the answers, the counters which have reference to these lessons are placed in a bag, whence they are

drawn at hazard by the scholars in rotation. If a correct reply be given to the questions, and the situations be shown on the blank maps, the pupil is rewarded by receiving a certain number of plain counters; but if he fail to give a satisfactory answer, he is obliged to pay in the same coin for the information from another pupil; or if the pupils all fail, from the instructor himself—he who at the end of the game possesses the most counters, is entitled to the precedence in the class. Abbé Gaultier carried his plan of teaching by game, on the blank maps, so far as to have questions founded on the *characteristics*, or *distinguishing marks*, designed to excite a recollection of what he has learnt of geography and history, by making him reason, combine, and reflect on it, and thus by enlarging his mind, to accustom him early to the ready application and exercise of his judgment.

Learning, in this way, may be made an amusement; and the only objection that we have heard against it is, that it savors a little of out of school gaming, and that it excites the *emulous* in an unwonted manner.

Heat, Magnetism and Electricity.

Professor Norton of Delaware College, has recently developed certain novel and interesting ideas concerning the nature of Heat, Electricity and Magnetism, which seem calculated to throw new light upon the whole circle of the Natural Sciences. We understand that he submitted an *exposé* to the Philosophical Society at their last meeting. He holds that the phenomena of light, heat, electricity and magnetism, are alike due to the undulations of the ether of space and the vibration of the particles of bodies. He conceives that the waves propagated from the vibrating particles

of a self-luminous body, differ in time and intensity of vibration, with the depth of the particles below the surface, and differ in intensity of vibration from one particle to another at the *same* depth; and that the refracting, absorbing, &c., actions of other bodies upon the waves, vary with their intensity and time of vibration. He supposes that self-luminous bodies may be considered as divided, for a certain depth, into a series of laminæ, the first of which, (which is in general much the thickest,) emits waves of simple heat, and the others in succession those of red, yellow, blue, and perhaps violet light—the other colors in the spectrum being formed by combinations of these. Below the lamina which sends violet light, he places that of the chemical rays. Waves of simple or dark heat differ from those of light, in having greater intensity and a longer time of vibration. *All* the various actions of different bodies upon light and heat, are placed upon the same general grounds; and the correspondences as well as differences of the phenomena of these imponderable agents explained.

The various phenomena of electricity he attributes to the impulsive actions of polarized waves, excited in general by the mutual actions of contiguous surfaces, with or without the aid of friction. He thus explains the mechanical and chemical actions of galvanic currents, the attractions, repulsions, &c., of electrified bodies, and capillary and endosmos and exosmus attractions.

The magnetism of the earth receives an explanation from the same general views. This is attributed chiefly to the vibrations of the particles to the earth's surface, and to a moderate depth below it, induced by the impulsive actions of certain waves transmitted from the Sun. These vibrations diminish in intensity with the temperature of the earth, from the equator towards the poles.

These fundamental ideas lead readily to a complete explanation of the polarity and dip of the magnetic needle, the variations of its declination in passing from one point to another on the earth's surface, and the periodical as well as irregular variations of the position of the needle. They also reveal the cause of the connection between the magnetism and the temperature of the earth, as shown by the correspondence in form between the lines of equal

magnetic force traced upon the earth and those of equal temperature, the coincidence of the magnetic pole with the pole of greatest cold, &c. Professor Norton has also formed upon the same general principles, a new theory of the Aurora Borealis, which, while it accounts for its luminous phenomena, furnishes a satisfactory explanation of the disturbances of the magnetic needle connected with this meteor. H.

The Test of Phrenology,

It is a well known geometrical principle, that similar solids are to each other as the cubes of their homologous lines, or the cube roots of similar solids, are to each other as their homologous lines. If therefore we ascertain the capacity of any skull, which may be readily done by immersing it in water up to a given point, and if we ascertain by measurement the distance of all the organs from the ear, (*mealus auditorius,*) or from each other, we can readily produce a skull of any given capacity, preserving the same form as them easured skull, and having all the linear measurements precisely what they would have been had the skull measured been of the capacity required. We may thus convert any number of skulls into skulls of precisely the same size or capacity; each one, however, containing exactly its own form, and the same relative development of its different parts. This done, the problem is resolved, and we can at once compare all the linear measurements of them with fractional accuracy.

For the purpose of ascertaining how far phrenology would stand this test, we visited one of the oldest phrenological museums in the country, in company with a phrenologist of note, and a well-known physiologist, distinguished for his habits of patient and

accurate observation, and, with a phrenological bust before us, we carefully measured casts of skulls of four murderers—Haggart, M'Kain, Pollard, and Lockey. For the purpose of drawing a comparison between these and heads of persons characterized by intelligence, wit, imagination, the kindlier affections of our nature, the sentiments of firmness, courage, and morality, we measured the casts of skulls of Burns, Swift, La Fontaine, King Robert the Bruce, and those of two females, Heloise and Stella. These, we conceived, would furnish many interesting points of contrast by which the truth of phrenology might be tested. We do not profess that these observations are sufficiently numerous for positive induction; but they may direct the investigation of others, who have leisure and inclination to pursue the inquiry, and who may agree with us in thinking that this is the only certain method of ascertaining the truth.

The following are some of the results obtained by a very careful application of the test:—

The skull of Pollard, in which this organ (destructiveness) is nearly the same size as in Stella, smaller than in Swift or La Fontaine, and half an inch less than in Bruce, was that of a man who, according to the writer in the *Phrenological Journal*, "had evidently been laboring under an excessive excitement of destructiveness, which had become so habitual and ungovernable, as to give clear indications before-hand of its existence and tendency." He was a butcher by trade, and a man of very depravedha bits. Under the influence of jealousy, he stabbed a man, and his wife and four children, his own mistress, and afterwards himself, the act being committed with the most savage atrocity. Of this ungovernable propensity to kill, there is certainly no evidence afforded by the form of Pollard's head. The organs of combativeness and destructiveness are comparatively small: they are so relatively, for on looking over the other tables, it will seem that this head is the finest of the whole ten, in its phrenological development. He is not deficient in firmness, having nearly as much as Bruce and Haggard, who were said to have had this organ prodigiously large. He has more benevolence than Bruce and Swift, who were both considered charitable men—more veneration than Burns, who is

allowed to have had both the organ and the faculty large—larger causality than Swift, and larger comparison, eventuality, ideality, and wit than either Swift or Burns, who both displayed all these faculties in an eminent degree. What may be asked, made this man a murderer? What, induced him to be a butcher? How did he acquire depraved habits? Why, with such a head, did he not educate himself, and become another Shakspeare? We wish we had the skulls of Shakspeare, Milton, and Bunyan: we think we could match them, and show a head that (phrenologically) should have beat them all, but it did not.

Haggard, who stole night and day, for four years, with unexampled activity, had the smallest organ of acquisitiveness. With the exception of the poacher, none of the others, so far as we know, ever stole at all. Swift, who with that exception, has the largest organ, and the less benevolence of the whole ten, was not a thief, but although frugal, was "a most kind and generous master, and very charitable to the poor." The poor within the liberty of his cathedral, were better regulated than in any other in the kingdom; he built an alms-house for them, and "preserved among them uncommon cleanliness and decency, by constantly visiting them in person." La Fontaine, who had the organ also large, showed little of this propensity; for on his annual visit to his wife in September, he always sold off some part of his family estate.

The measurement of the organ of wit requires no comment. Swift has the smallest! Indeed, on carrying the eye over the tables, we think that the worst head of the series is that of Swift. The posterior region of the head is, on the whole, larger, and the middle and interior regions smaller, than most of the others.

[*British Quarterly Review.*

On the Theory of the Photographic Action,

Illustrating the connection between the Photographic Agent and Electricity.

BY J. NOTT, ESQ.

Mr. Nott proceeded to say that, "since the discovery of Photography, there is, perhaps, no branch of electrical physics more interesting than that which comprehends the phenomena of phosphorescence. For though light be the apparent agent in the production of the photographic picture, yet the accompanying circumstances can only be satisfactorily explained by a reference to electrical principles. Light is a term merely relative to us; but light itself has no absolute existence any more than sound: then how unphilosophic are the terms latent light, and light in darkness, which we sometimes hear—as if that which is merely an effect could be regarded as a cause, or as a physical force, at the same time that we know it is not possible to demonstrate the existence of any other physical force in nature than electricity. Light is, therefore, only an attendant circumstance in the production of the photographic picture; and this seems proved by the fact of one body impressing its image on another in the dark, when the bodies are approximated at what, in electrical phraseology, is called the striking distance. As light, then, cannot be regarded as the photographic agent, electricity, which, in all probability, is the principle of light, would seem to be; and the effects produced, when phosphorescence is developed through juxta-posed transparent media, of different densities or electrical affinities, bear so striking an analogy to those which are produced upon a sensitive surface when exposed to the action of light, reflected from bodies in different degrees of intensity, as to render it probable that what is understood by the term photography, is a simple case of phosphorescence by insolation. For, as we find that some parts of the sensitive surface then exhibit what may be called an elective affinity for certain substances, while others do not, these effects can only be the result of simultaneous attractions and repulsions; the manifestation of which is inconceivable, independently of the presence of electricity. The question then arises, if the photographic picture

be the result of electrical action, why may not the color as well as the contour of bodies be taken down, seeing that color is not a property of matter, but is a property of light? All bodies are seen only by reflected light, and their colors vary in tint according to the position of the spectator, with respect to the plane of reflexion. For instance, in the normal of the plane of reflexion, the color of bodies is most distinct; and at every deviation at this point the local tint changes, and, in many cases, is extinguished when the eye of the spectator reaches the angle of total reflexion. Thus, then, when the reflected light is the strongest, the color of bodies is least perceptible, and vice versa. These considerations induced me to try what comparative effects would be produced upon a sensitive surface by light reflected at various angles of incidence from the plane of the picture. The effects which were thus prodnced were analogous to those which are observed in nature; the local tents of the bodies represented varying with every change that was made in the angle of reflexion in which the picture was taken down, and the direct ray invariably gave less picturesque results than when a parallel glass was used. In some specimens taken with the parallel glass, when they are looked at directly, all the appearances of a radiating reflexion were presented; and when looked at obliquely, all those of a specular reflection, as if the sun were actually shining within the picture itself. These results gave promise that some remarkable effect would be produced by polarized light: I therefore had a small sun-dial made, the style of which was formed by a bit of very fine silver wire; and from the centre of the dial, a bit of the same wire was erected perpendicularly, so that the hour angle and the sun's azimuth were given at the same instant. By means of this instrument, I was able to determine, with accuracy, the position of the sun with respect to the plane of the picture that I wished to make a photographic representative of; the glass of the camera was also made adjustable to the polarizing angle by an attached graduated quadrant. When, by these means, the light was polarized into the camera, by a double reflexion, from the plane of the picture and from the parallel glass, I found that the objects in deep shadow and those in sunlight were taken down simultaneously and

with equal precision, without the slightest trace of solarization: exhibiting a sunlight view of the greatest truth and beauty, in which the transparency of the shadows, and the effect of distance produced by an exquisite gradation of tint, are such as Art could scarcely hope to imitate. This result of polarized light seems doubly interesting since the recent discovery of Mr. Faraday, where a ray of extinguished polarized light is re-illumined by electricity. How far this discovery may enable us to determine the nature of the active agent concerned in the production of the photographic picture, I will not, at the present moment, presume to decide."

Electricity—A Pleasing Experiment.

Notwithstanding the effects of the wonderful power of electricity are continually before us, and we are constantly witnessing its wonderful phenomena, with all the mysterious developments and results which it produces, we can scarcely realize how inseparably connected it is with all the various and ramified workings and changes of the natural world, and its consequent connections with our own vital properties and powers. The *Mechanics' Magazine* relates a simple and pleasing experiment, illustrative of its singular effect, from a simple sheet of foolscap paper. The Magazine says:

Place an iron-japanned tea-tray on a dry, clean beaker glass, then take a sheet of foolscap writing paper, and hold it close to the fire until its hygrometric moisture is dissipated, but not so as to scorch it; in this state it is one of the finest electrics we have. Hold one end down on the table with a finger and thumb, and give it about a dozen strokes with a large piece of India rubber, from

the left to the right, beginning at the top. Now take it up by two of the corners and bring it over the tray, and it will fall down on it like a stone; if the finger be now brought under the tray, a sensible shock will be felt. Now lay a needle on the tray with its point projecting outwards, remove the paper and a star sign of the negative electricity will be seen; return the paper and the positive brush will appear. In fact, it forms a very extemporaneous electophorus which will give a spark an inch long, and strong enough to set fire to some combustible bodies, and to exhibit all the electric phenomena not requiring coated surfaces. If four beaker glasses be placed on the floor, and a book placed upon them, a person may stand on them insulated; if he then holds the tray vertically, the paper will adhere strongly to it, and sparks may be drawn from any part of his body, or he may draw sparks from any other person as the case may be; or he may set fire to some inflammable bodies, touching them with a piece of ice.

The Silver Birds-Nest.

A stranded soldier's epaulette,
The waters cast ashore;
A little winged rover met,
And eyed it o'er and o'er,
The silver bright so pleased her sight,
On that lone idle vest,
She knew not why she should deny
Herself a silver nest.

The twining wire she picked and twirled,
Then bore it to her bough,
When on a flowering branch 'twas curled,
The bird can show you how;
But when enough of that bright stuff,
The cunning builder bore
Her house to make, she would not take,
Nor did she covet more.

And when the little artisan,
With neither pride nor guilt,
Had entered in her pretty place,
Her resting place had built;
With here and there a plume to spare,
About her own light form,
Of these, inlaid, with skill she made
A lining soft and warm.

But do you think the tender brood,
She fondled then and fed,
Were prouder when they understood,
The sheen about their bed?
Do you suppose they ever rose,
Of higher powers possessed,
Because they knew, they peeped and grew
Within a silver nest?

Notices of Books.

Dr. Reese's Improved Edition of Chambers's Educational Course.

We have been favored with copies of these volumes by the publishers, Messrs. Sorin & Ball, of Philadelphia. The entire series embraces the following, viz:

1. Rudiments of Knowledge in Common Things.
2. Introduction to the Sciences.
3. Rudiments of Animal Physiology.
4. Rudiments of Vegetable Physiology.
5. First Book of Natural Philosophy, embracing the Laws of Matter and Motion.
6. Second Book of Natural Philosophy, including Mechanics.

7. Third Book of Natural Philosophy, comprising Hydraulics and Pneumatics.
8. Rudiments of Chemistry.
10. Rudiments of Zoology.
11. First Book of Drawing.
12. Second Book of Drawing.

To which Dr. Reese is about to add—

Rudiments of Astronomy.

First Book of Moral Science, and

Treasury of Knowledge on Common Objects; which last has been already published.

The extensive and successful labors of the brothers, Messrs. Chambers of Edinburgh, in providing cheap popular literature, and especially in supplying the schools with books of high practical value, entitle them to an elevated rank among the patrons of universal education. The books of their scientific series especially, have been deservedly esteemed, and are generally adopted in the schools of Great Britain; and their republication in this country, becomes a disideratum.

Doctor Reese, during this brief term of office as Superintendant of Common Schools of the city and county of New-York, devoted his leisure hours to preparing an American edition of the series, with numerous improvements, adding analytical questions upon every page, by which he has rendered a valuable service to teachers and pupils, having thus adopted the books to greater usefulness. The volumes are all neatly and uniformly got up, in convenient size, and abound with engravings and diagrams, which are well executed. We are not surprized to learn that they have already been introduced into the schools so extensively as to afford evidence, that among practical educators all over the country their merits are justly appreciated. Every volume has undergone the revision of the American editor, D. Meridith Reese, M. D. LL. D. who is well known for his zealous labour in the cause of popular education; and especially for having lost his office by the uncompromising tenacity with which he contended for the Bible in schools.

As friends to the elevation of the standard of popular education, and particularly to the early cultivation of the physical sciences in the schools, we hail with our best wishes every effort to simplify this department of knowledge, and bespeak for this series the candid examination of practical teachers.

Manual, Analytical and Synthetical, of Orthography and Definition, by Jas. N. McElligott, Associate Principal of the Collegiate School, New York, and late Principal of the Mechanics' Society School. New York: M. H. Newman & Co., 199 Broadway,

The prime and predominant feature of this book is, fitness of design. It consists of a systematic series of exercises, (seven or eight hundred in number,) all framed in such a manner as to require to be written out by the pupil, and consequently, calling for the exercise of care and judgment at every step in the progress of forming words by their proper letters. The appeal in the matter of orthography, is constantly to the *eye*, and not, as it commonly is, exclusively to the *ear*. In *talking*, the good is not easily distinguished from the bad speller; in *writing*, however, the difference is immediately manifest. Hence, the wisdom of a free and frequent use of the pen in teaching this branch of knowledge.

But the fitness of the work for the end proposed, is yet more strikingly evinced, in the admirable expedients employed for showing the true meaning and application of words. Now is afforded the opportunity for comparing those of like import, and tracing the distinctions between them; now is given the means of viewing those opposed in signification, in the full light of contrast. Now, side by side, are placed those numerous and often puzzling terms, which, though alike in sound, differ totally in sense; now, each separately explained and accurately adjusted the one to the other, appear the various elements engaged in the production of derivatives and compounds; and now, finally, a complete re-union of all the parts, with a clear and satisfactory account of the connection between the primary and endlessly diversified metaphorical applications presented. Yet, all is plain,

all is *practical;* exhibiting at once the result of profound inquiry into the philosophy of language, as also of signal skill in the art of teaching.

First Book of Natural History.

This First Book on Natural History, by A. Ackerman, is from the press of Paine and Burgess, 60 John st. Its design avowedly is, to awaken a spirit of inquiry in the minds of youth, by bringing before them, in as simple a manner as possible, some of the most interesting portions of the history of the animal kingdom. We think that Mr. A. has succeeded in presenting, in an interesting aspect to the young, much valuable information. It is as much divested of repulsive technicalities, that usually appear so formidable to children at the commencement of study of this kind, as the subject will admit. The book begins with some account of the more common phenomena of astronomy, and the meteors of the atmosphere; and treats of the world of life, from the reasoning animal down to the minutest insect, giving many details, and much useful information, in a style comprehensible to children. It will be found a valuable book, and we have no doubt will find its way into many of the schools of our country.

New English Spelling Book, from the press of Leavitt, Trow & Co.

The distinguishing feature of the plan of this book, is the classification of the elements of the language. It is made up of several vocabularies from various sources, as follows, viz: The Anglo-Saxon and kindred elements, the Celtic and Gothic, the Latin, the Greek, the French, the Italian, the Spanish, &c., arranged severally according to the parts of speech, making an aggregate vocabulary of 9,442 words. It will be interesting for the young learner to know that his vernacular is not a simple original tongue, but that it is compounded and enriched from various sources in certain very nearly determinate proportions. The number of words is large, but not quite so full as some others, and there are a few

trifling errors and inconsistencies, which the modesty of the unrevealed author seems to have expected, as we observe by a remark in the preface. The plan, so far as we know, is original, shows the marks of genius and investigation, and the English Spelling Book enters the arena with no mean pretensions.

ILLUSTRATED FLORA.—The attention of readers of natural science and works of taste, is respectfully called to the Illustrated Flora, published at the office of this Journal, and edited by John B. Newman, M. D. Dr. Newman, who claims to be a pioneer in this style of botanical description and illustration, does not mean to be outstripped by any competitor who may enter the lists, and we have no doubt that, under any circumstances, will present a strong claim for public patronage.

The Properties of Numbers.

We propose to give in our next and subsequent numbers, a series of articles on the properties of numbers, by T. Clowes, LL.D. The Doctor's playful invention and research have discovered and evolved some new principles of computation, that will surprise and delight the lovers of mathematical science.

We bespeak for his developments, an examination; and if it should appear that he has done as much to bring out and explicate the principles, properties and powers of these ten symbols which constitute our numerical alphabet, as any man since Napier, why should he not take rank among the benefactors of the science of numbers?

Mathematical Science.

Science, in its most general and popular acceptation, means knowledge; but, in its more restricted and technical sense, has been well defined to be "knowledge reduced to order;—that is, knowledge so classified and arranged, as to be easily remembered, readily referred to, and advantageously applied."

The Pure Mathematics embrace the three subjects of Arithmetic, Geometry, and Analysis, and are called the exact sciences. Why are they so named? Is the term *exact* more applicable to them than to other branches of science? Are the definitions more clear—the axioms more evident—the reasoning more certain and satisfactory than in other departments of knowledge? We answer, yes. In other branches of knowledge, the very technical terms may have a different meaning in different minds, and an entire system of reasoning may depend for its results on the right conception of a few elementary definitions. Even in the applications of Mathematics, we lose that uncompromising certainty which we find in the science itself.

The Pure Mathematics are divided into three principal subjects,

1st, Arithmetic. 2nd, Geometry. 3rd, Analysis.

Arithmetic is the science of numbers. Numbers are the expressions for one or more things of the same kind. In Arithmetic, numbers are expressed by certain characters called figures. There are ten of these. With these ten simple characters, any number, however large, and every number however small, may be exactly expressed. This language of figures is at once very simple and very comprehensive. Its alphabet embraces but ten little characters, and these, by their various combinations, will reach every number. They express the relative size of a grain of sand, and of the earth we inhabit;—yea more, they will present to the mind a clear and distinct impression of the diameter of a spider's web, and of the distance to the remotest planet of our system.

These little figures are of great value, even in a mere practical point of view. The merchant, the mechanic, the tradesman, nor even the housekeeper, can go through a single day without the use of figures. Our knowledge of numbers is acquired so early and so gradually, that we scarcely remember the time when we were

unable to count our fingers: nor are we apt to consider that it is doubtless owing to the fact of our having ten of them, that that number has been adopted as the basis of our numeration table, on which our whole system of numbers has been constructed. The ten little characters which are used to carry out this system, are perhaps of more value to us than we are willing to allow. They keep most accurately the accounts of the merchant, and tell, upon his balance sheet, the exact state of his affairs. In a commerce reaching from the frozen ocean to the Islands of the South Sea, they will not, unless misused, permit a single cent to go unaccounted for: nor will they, if applied according to the improved rules of book-keeping, ever fail to detect the slightest error. They are little sleepless sentinels, which watch over the transactions of trade and commerce, and sum up and make known their results.

Geometry, which comes next in order, like most other branches of knowledge, had its origin in the necessities of mankind. The annual overflow of the Nile, which prepares the soil for the labors of the husbandman, sweeps away the landmarks of property, and reduces annually that beautiful valley to a single field. The recurring necessity of re-establishing the landmarks—noting the boundaries, and marking out anew the lines of division, gave rise to the art of Surveying—and this, to the science of Geometry. In the infancy of this science, it aimed only at the measurement of land; but has since been extended to the measurement of solidity and all the properties which result from figure and extension.

The science of Geometry is founded on the uniform operations of the mind. It begins with elementary principles, which the mind, from the very laws of its nature, admits as true.

Our minds, like every thing else which has come from the hands of our Creator, are subject to general laws, from which we cannot, if we would, divorce them. These laws are fixed and invariable;—when we understand them, every apparent change is but constancy, and every apparent diversity, but uniformity. These laws are as inexorable and certain in our intellectual and moral as in our physical nature. All are affected in nearly the same way, by the same causes operating under like circumstances. Light, heat, and the vicissitudes of the seasons, exert upon each

and all their respective influences, according to the same general laws—so likewise, the same moral truth, or the same intellectual proposition, will, under like circumstances, affect the conscience or the mind, according to laws as fixed and certain as those which govern the earth in her orbit, or regulate the motions of the planetary system.

The principles which constitute the foundation of the geometrical reason, are called axioms, or *self-evident propositions.* They are such as these:

1. A straight line is the shortest distance between two points.
2. Things which are equal to the same things, are equal to each other.
3. If equals be added to equals, the sums will be equal.
4. If equals be subtracted from equals, the remainders will be equal.
5. A whole is equal to the sum of all its parts, &c. &c. &c.

Are these propositions true? We answer, yes. If it be asked, do you know them to be true? we answer,—our consciousness attests their verity, and the unanimous testimony of mankind bears witness, that they affect all minds in precisely the same way. This consciousness, verified by the unanimous testimony of others, is the highest degree of certainty of which we are capable. It is the very point at which every system of reasoning must begin and terminate. The senses are wayward and erring messengers, in conveying impressions to the mind. Our sight, the most perfect of them, is often illusory. The sense of smell, the touch, the taste,—our hearing, may each and all be deceived and cheated—but the elementary conception of the right line—the pure diamond thought of the axiom, carry a conviction about which the mind cannot be deceived—which indeed it cannot resist. Geometry, therefore, lays its foundations in the unchanging laws of our intellect. The axioms and definitions are the corner stones on which the superstructure is reared—and the materials of which it is constructed, are simply three, viz., Lines, Surfaces and Solids. These are called the geometrical magnitudes.

Lines are of two kinds—straight and curved. There are also two kinds of surfaces—plane surfaces and curved surfaces. The

solids are also divided into two classes: viz., those which are bounded by planes, and those which are bounded by curved surfaces.

The straight line, and the circumference of the circle, afford an example of the different kinds of lines—the plane and surface of a sphere of the two kinds of surfaces, and the common cube and sphere of the two kinds of solids. Besides these geometrical magnitudes, there is yet another class resulting from the position of lines, viz., the angles. These are not elementary quantities, but come from placing lines in a certain position, with respect to each other.

We have now named all the things to which the reasonings in Geometry are applied, viz., Lines, Surfaces, Solids and Angles. To discover the properties and relations of these magnitudes, constitute the science of Geometry.

But how is the reasoning to be conducted, by which these properties and relations are made known and developed? It must be based, as we have already said, upon the axioms—it must be conducted by the rules of right reasoning, and each process must evolve an existing, though unknown truth. The process is called a demonstration. Hence, a demonstration is a system of reasoning, based upon known principles, connected by sound logic, and terminating in truth.

Every demonstration may be divided into three parts—1st, the premises—2nd, the reasoning or argument—3rd, the conclusion. If the premises are right and the reasoning correct, the conclusion will of course be true. But we sometimes reason from hypothesis. Supposing our reasoning to be correct, as before, if it leads to a conclusion which we know to be right, then we conclude that the premises are also right. But if the reasoning leads to a conclusion which we know to be erroneous, then we infer that the hypothesis was wrong—and this is called the "*reductio ad absurdum*," or the method of reasoning, which leads to an absurdity. Hence we see, that whether we employ the direct method, which proceeds from known principles, or the indirect method which is based on hypothesis, we are equally certain of arriving at truth—under the

supposition, however, that the reasoning, or argument, is always correct.

We should remark, that in both methods the premises and conclusion must always agree—that is, they are always both right or both wrong. In the direct method, the premises are known and acknowledged truths, and the conclusion is the result of the reasoning —and is necessarily true. In the indirect method the premises are assumed and if the reasoning leads to a *known principle* or *truth*, the premises are then proved to be true. If, on the contrary, the reasoning leads to what is known to be untrue, the premises are then known to be false.

These principles of reasoning obtain not only in Geometry, but they constitute the basis of every system of sound logic.

How does the lawyer argue a question at the bar? The facts of the case, and the established principle of law applicable thereto, are his premises. If the facts of the case bring it within the range of an established principle, the question is at once decided, and the conclusion follows irresistibly. But such is the varying nature of human affairs, that new cases arise, almost daily, differing more or less from all others which have preceded them. To such no one single principle may be applicable. The powers of the advocate and jurist are then called forth. He spreads all his facts before him—examines every principle of law bearing on the point in question, and compares every analogous case which has been decided. These make up his axioms and premises, and from them he may construct an argument approaching in point of certainty to a geometrical proof.

In regard to Geometry, we have, then, stated the following facts:

1. That the axioms of Geometry, on which the reasoning is founded, are existent truths, to which the mind, by the very law of its nature, must assent. Indeed, we can no more doubt them than we can doubt the existence of light, when we turn our eyes on the noon-day sun.

2. We have said that the subjects of the geometrical reasoning, or the things to which the reasoning is applied, are, 1st, Lines—straight and curved—2nd, Angles; 3rd, Surfaces, plane and curved—and 4th, Solids. It has also been remarked—

3. That the science of Geometry consists in determining the measures, relations and properties of these magnitudes; and

4. That in the various chains of argument, by which these properties are discovered and developed, it is not permitted to use any principle or fact unless it be laid down in the axioms, or has been previously established by rigorous demonstration. The reasoning at each step, consists in combining the facts and principles already known, and deducing therefrom new principles and new truths.

We come next to the third and last division of the Pure Mathematics, viz. Analysis.

The elementary principles of this branch of science are known to you under the name of Algebra,and some of its higher branches under that of fluxions, or the differential and integral calculus. In this branch of Mathematics, the reasoning is conducted by means of letters and signs. The letters of the alphabet are used to designate the quantities or things, which are the subjects of the reasoning—and the operations to be performed,and from which the results are to flow, are indicated by certain arbitrary characters, called signs, and of which the number does not exceed ten. With these humble means, viz. a few letters of the alphabet, and from six to ten simple signs, we are able to pursue trains of investigation leading to the most important results. This branch of Mathematics may properly be said to embrace both the others. It is alike applicable to the simplest question of Arithmetic, and the most difficult proposition of Geometry. It is a splendid system of generalization, embracing within its ample folds every question which can be the subject of mathematical enquiry.

Let us here notice a striking difference between the geometrical and the analytical method of reasoning. The first, as we have already observed, starts from the simple axiom, and by combining known principles, establishes new ones. The new principles thus developed, are again combined with those previously known, and thus, as the reasoning advances, new truths are constantly multiplied. In analysis, on the contrary, the very reverse method is adopted. Instead of going from particulars to generals, we go from generals to particulars.

The geometrical method would teach the properties of a machine, from a careful examination of all its parts. You would examine every wheel—determine its precise place and office—note every spring, and calculate its intensity—and from all these are deduced the general consequences from their combination.

Analysis would take the machine in motion, examine the moving power and note its results—and then, from these general consequences, determine every wheel and spring, and cog of which it is composed.

The geometrical method would take the facts derived from observation and experience, and from these prove the general law of gravitation. The analytical method would assume that law, and then show that its existence is necessary to the harmony of the universe. The law being once known, analysis would develop, as with an enchanter's wand, all the facts and consequences which flow from it. In all the methods we have entire certainty.

We know, as well as we can know any thing, that a straight line or circle, presents to all eyes, the same shape or appearance, and makes on all minds the very same impression. About this there is no doubt—no uncertainty. We also know, that the process of reasoning admits of no error, and that the truths which it reveals, can never be obscured by the mists of scepticism.

We shall, in the next number, refer to the agency which the Mathematics have exerted in enlarging the boundaries of human knowledge—in increasing the power of mind over matter, and in multiplying the comforts, and in advancing the civilization of man.

Elements of Geography.

Geography literally means a description of the earth, but by an extended and liberal view, it contemplates the earth with all its aggregated furniture and materials, its shape, its dimensions, motions, productions, animal, vegetable and mineral, its land and its water, with whatever appendages nature has supplied. It not only embraces the topography of every place, but it descends to minute descriptions of particular places. It describes the continents

and the oceans, the great peninsulas and the seas, the lakes, the currents, the streams, the mountains, the caverns, the cities and the deserts, with all the multitudinous existences of the earth. A celebrated author observes that geography is the rival and sister of history. If the one has the empire of time, so has the other of place; and although they are in themselves,abstractedly considered, distinct and separate, yet they are so affiliated and allied, that it is hardly useful or proper to dissever them in a practical treatise.

The importance of accurate geographical knowledge will seldom be over-rated. To every pursuit of man, a knowledge of some parts of the earth is absolutely essential. The professor, whatever be his chair, will hardly acquit himself with honor without some acquaintance with geography. Is he a civilian, or a lawyer? it furnishes him with the reason and origin of laws, and constitutions of government. Is he a physician? he learns here the different climates, their influence upon human life, their products suited to his materia medica, which are fitting subjects for his investigation. Is he a theologian or divine?—the great truths of the bible are often best illustrated by an acquaintance with the geography and meteorological characteristics of the countries in which those truths were first delivered. Is he a military commander?—it shapes, controls and guides his movements. Is he a sailor?—by it are limited his pathway and his destination. Is he a merchant? it influences and directs his trade and speculations. Is he an agriculturist? it is the domain of his toil, and its favored locations the ultimate aim of his desires. But vain would be the attempt to enumerate and set forth its importance and advantages in *extenso.* It is not, that it is an independent and isolated science, that it is chiefly valued, but rather because it enters into, and mingles with, almost all other knowledge. Every real and tangible existence occupies space and place; but these are among the prime elements of geographical science.

Without a knowledge of the figure and dimensions of the earth, its countries, nations and products, customs, commerce and civilization, a man who has any business to transact in the world, (and who has not?) is all the time liable to gross imposition. The lying tongue of romance beguiles him with the story of some im-

paradised Eldorado, or the ungoverned fancy prophesies the revelation of some *terra incognita*, stored with enjoyments for coming days, or for another generation, that lead the trusting and unread man from the proprieties of his better judgment. Had he studied geography in the liberal way suggested in these remarks, how much time would he have redeemed; how much money would he have saved? and how much mortification would he have avoided? Thousands remove to better their condition, and are bitterly disappointed, just because they were ignorant of the physical geography of the place to which they emigrated. True mathematical, physical and descriptive geography, is a sober science. It speaks of places, and of things that pertain to those places, as they are. It is true that geography has ever been, and still is, very deficient. Many a large tract on the globe is yet a land or a sea unknown. Writers depending one on another, have repeated the same errors, until they have made them almost venerable. As science advances, explorations are more extended, analysis is more rigid, and descriptive narratives are more veritable. It is becoming a general opinion, that the progress of science has been much retarded by the repetitious publication of erroneous accounts and mere hypotheses. If authors, in the course of investigation and description, meet with desiderata that are yet unrevealed, as they always will, it were better that they acknowledge their ignorance, and that the description remain deficient, and the map blank, until the surveyor, or voyager, has determined the truth.

At one time it was a question whether the earth were flat, cylindrical or spherical? Whether there were a southern temperate zone? Whether the torrid zone were habitable? Whether there were another continent? And then, whether Greenland were a part of the western continent? The source of the Nile? The mouth of the Niger? The North West passage? and a Southern or Antarctic Continent? These were all, in their turn, mooted questions with geographers. These are now all settled; and the answers to some of them seem so easy, that the ignorance and incredulity that raised such doubts, are now looked upon with amazement. The world has so long been the abode of men, the marvel is that they could have so long been kept in a state of adolescence with regard to its description.

The days of discovery and improvement are come. The spell that kept the world stationary, is broken. The remote corners of the earth, the abodes of savage cruelty and rapine, are brought by the improvements and discoveries of the last few years, into the neighborhood of christianity and civilization. Pioneers, like Parke, Ledyard, Clapperton, and the Landors, are not wanting, who are ready to explore the arid wastes of Africa. Nor can the regions of arctic frosts and winter remain secluded, a land or a sea unknown to a Hearne, a McKenzie, a Ross, a Parry, and a Franklin. The enterprise, sagacity and success of the present age, have exceeded every other in the world's history.

The day is at hand, when it will be a reproach for a scholar not to know the general outlines of the geography of the whole earth. As science progresses, the great physical laws of nature are made to subserve moral uses. Physical and natural agencies are evidently forming combinations for great results. Christianity and commerce, with their moulding influences, harmoniously co-operate for the accomplishment of great benefits to men. The day of some great consummation is evidently *hastening* on. The wings of the wind, that have so long wafted to and fro the commerce of the world, move slow in comparison with the substituted power of steam. The imprisoned steam, trained by mechanical skill, outstrips the wind, in the conveyance of merchandise; and the lightning, which has so long filled the superstitious with fearfulness, is made the swift messenger of tidings between remote sections of country. If the spirit of *trade*, and the spirit of christian missions, join in the enterprise of enlightening the world, what may we not expect? What remote corner of the world will remain long unvisited? By these improvements in locomotion and communication, remote regions are brought into proximity, man every where is our neighbor, and interest as well as duty leads to the sedulous cultivation of peace and brotherhood with the inhabitants of every clime.

In a few days, and with but little bodily exertion, a man may be set down upon the verge of civilization in his own country, or in the thronged marts of another hemisphere; subserviency to trade, or to the ministry of mercy, are ever in his power, and his enlarged philanthropy soon leads him to inquire, where is he that lifts the human face divine, that is not a man and a brother?

We have made the foregoing remarks as preliminary to a series of numbers on the subject of Geography, which we design to present systematically, taking up the several elementary topics that properly belong to the general subject; and first, we would speak of the figure and dimensions of the earth, and of the modes of determining sundry of its phenomena and positions, by calculations. This is what is called MATHEMATICAL GEOGRAPHY. Indeed, all that is scientifically exact in the explication of the doctrine of the sphere, is mathematical; and this is true also in astronomy, so that geography and astronomy are both mixed mathematical sciences, and a few remarks seem necessary, which are equally applicable to both.

For instance, zenith and nadir, up and down, are relative terms, always having reference to the centre of the earth, which is also the centre of gravity, and is indicated by the direction of a falling body. It is also plain, that east and west, are convertible terms, and that a star or planet, that is east of us, is west of our antipodes, and that so far as it relates to positions on the globe, there are two places, or points, to which there is neither an east nor a west.

It follows from this, that the horizon changes relatively to the stars, when the observer changes his locality upon the earth; for instance, standing at the equator, you observe a star, or the sun in the horizon, just now rising. That star or sun is now culminating 90° east of you, and is, at the same time, in the western horizon of your antipodes. This, however, will not be precisely true at any other place, except at the equator. The reason of this is to be seen in the three positions of the sphere, viz., right, oblique, and parallel. To persons at the equator, the heavenly bodies appear to rise and set vertically to the horizon, and to pass through the zenith and the nadir, because they are in coincidence with the plane of the equator. To persons between the pole and the equator, the sphere is oblique, because the rising and setting heavenly bodies do not make a right angle with the horizon, nor pass through the zenith, or nadir. At the poles, the sphere is parallel, because the heavenly bodies perform circles that are parallel to the horizon, which horizon is also parallel to, or in coincidence with, the plane of the equator.

The shortest distance between any two places that are north and south of each other, or on the same meridian, is the difference

of latitude; and this is the reason that the meridional lines are the arcs of great circles upon the globe. It is not so with the reckonings of longitude, except they be measured at the equator. Longitude measured on the parallels, is less and less as the parallel is nearer the pole; but, in no instance, will the longitudinal line be the nearest distance between any two places, that are east and west of each other. The reason is, that the parallel is the arc of a small circle, and the curvature is greater in a small circle that joins any two points, than in a great circle joining the same point.

If two places be situated in any other position than exactly east and west of each other, at the equator, the great circle drawn through them will not cut the different meridians at right angles, but it is these angles which determine the course. The course will, therefore, be changed, just as much as the angles differ, because it is only what these different converging meridians are crossed at the same angle, that the same course is preserved. A ship that should sail upon the great circle, that passes through two places not on the same meridian, would be constantly changing its course; because to preserve the same course, it must cross these several converging meridians at the same angle. Those lines which make equal angles with the several meridians are rhombs. Now it is plain that a rhomb line can never return into itself, or complete a circle, but will always be approaching nearer and nearer to the pole, without ever reaching it. This spiral is called the loxodromic curve. These are things connected with Mathematical Geography, frequently not well understood, and so useful to be known, and so simple of exposition without philosophical or mathematical instruments, that two or three of them are suggested. For instance, it is required to know the cardinal points of the horizon, or ascertain the accuracy of a timepiece; these may be done in a simple way by two altitudes of the Sun. The best time in the year is at the time of the solstices, when the declination of the Sun is the same in the fore and afternoon; but making a small allowance for this difference of declination, it may be made with sufficient accuracy at any season of the year, and in any latitude. For instance, the Sun in the morning has a given altitude, which you ascertain by a quadrant, or otherwise. At the time you take this altitude, your watch is at 9h. 36 min. It attains

to precisely the same altitude in the afternoon, when the timepiece is 2 h. 30 min. 18 sec. The length of time from 9 h. 36 min. A.M., to 2h. 30 min. 18 sec. P.M., is 4 h. 54 min. 18 sec.; half of this is 2 h. 27 min. 9 sec., and this added to the time of the first observation, will be 12 h. 3 min. 9 sec.; the watch, therefore, indicated 3 min. 9 sec. past 12, when the Sun was in the meridian. Apply the correction to the timepiece, and draw a meridional line by the corrected time at the next observation, and then a line drawn at right angles to this, will be due East and West, you will thus have the true time and the points of the compass.

The doctrine of the sphericity of the earth was received by some of the learned among the ancients, and it became a desideratum with geometricians, to ascertain the magnitude of the sphere. Dialling was understood, and it was known that at the time of the summer solstice, the Sun was vertical at Syene, on the Nile. The gnomon projected no shadow at noon, and the Sun shone upon the bottom of a deep well, and was therefore perpendicular. But at Alexandria, Aratosthenes found that the Sun made an angle at noon from a perpendicular of 7° 12′: but 7° 12′, are the one-fiftieth of 360°. Alexandria, therefore, he reasoned, must be distant from Syene just one-fiftieth part of the circumference of the whole earth. Thus was developed in ancient Egypt a true principle of calculation; and although Syene is not, as was then supposed, precisely at the tropic, nor is Alexandria on precisely the same meridian, yet the principle of computation developed is correct, and it is surprising with what accuracy the circumference of the earth was determined by multiplying the measured distance from one of these places to the other by fifty.

Next, a simple method of determining the latitude is suggested. The concave vault of the heavens which surrounds us has two stationary stars, known as poles or pivots, about which all the other stars *appear* to revolve. A person at any considerable distance from the equator, sees a number of stars that are circumpolar, or stars which revolve round the pole, and to him never rise or set. During every revolution of the earth on its axis, these each appear to make a revolution round the celestial pole, and appear thus twice on our meridian, once above, and once below the pole, every twenty-four

hours. We have, therefore, only to measure the two altitudes, or angles of elevation, and take their arithmetical mean, i. e., add them together, and take half of their sum, to determine the exact latitude. For instance, the star known as the pole star, is one of those circumpolar fixed stars situated very near the true pole, but in taking its true meridian altitude, the one when it is above, the other when it is below the pole, there appears a difference of 3° 33'. For example, two meridian altitudes taken any given night, at the City Hall, New-York, are as follows, viz:

The upper meridian altitude,	42°	29′	10″
" lower " "	38°	56′	10″
These added, are	81°	25′	20″
The half sum	40°	42′	40″

which is the true latitude of the City Hall, ascertained by the easy and familiar method of two altitudes of a star. There is another simple method of determining the latitude by a single altitude of the Sun. If it be at the equator, as at the time of the equinoxes in March and September, then the altitude will be the complement of the latitude; but if the sun have declination, you will add it to or subtract it from 90°, and then subtract the altitude from this, and you will have the latitude.

Scholars learn from their books that the ecliptic crosses the equator at an angle of 23° 28', but how is this proved? Ought they to take a mathematical truth on authority, or demonstrate it for themselves?

The longest day in June, the sun obtains an elevation in the latitude of New York,

Above the horizon of	72°	45′	20″
Shortest in Dec. its meridian altitude is	25°	49′	20″
Difference of altitudes,	46°	56′	
And the half of this is the angle sought	23°	28°	

The earth being a sphere, it will be perceived that this is the angle which the ecliptic forms with the equator.

We come now to speak of longitude, and some of the ways of determining it. This is to the geographer an important head, beset indeed with some difficulties, inasmuch as the methods of determining it are not generally so sure and undeviating as those for ascertaining the latitude. It is, however, known that the earth performs a revolution of its three hundred and sixty degrees in twenty-four hours, or fifteen degrees in an hour, fifteen geographic miles in a minute, or one mile in four seconds, so that distance is easily convertible to time, and *vice versa.*

If therefore at sea, or on a journey, we have the longitude and time of the place left, by taking the sun's meridian altitude, as before described; we ascertain the difference of time between the place reached and the place left. This is shown by the difference between the chronometer and the meridian time of the observation, which, as has been shown, is easily convertible into longitude. But the eclipses of the sun, moon and satellites of Jupiter, and transits and occultations of other heavenly bodies, furnish probably the best modes of determining longitude. These occurring at the same instant of absolute time to every person on the hemisphere that sees their light. The eclipses of the sun and moon are much used for this purpose, as every traveller and navigator can possess himself of a Nautical Almanac, in which these are calculated for London, or some other given meridian; he ascertains the difference of the true time of the two meridians, by adding or subtracting, as the place may be on the same, or on different sides of the same meridian. An eclipse of the moon appears exactly at the same time to all those parts of the earth where it is visible. An eclipse of the moon was observed August 28, 1729, by Casseni at Paris, and by Mr. Stephenson at Barbadoes.

	h.	m.	H.	M.	S.
Time of immersion at Paris,			12	19	13
" " of " at Barbadoes,			8	11	0
Time of emersion at Paris,	13	59	4	8	13
" " Barbadoes,	9	51	4	8	0
	4	8	2) 8	16	13
			4	8	$6\frac{1}{2}$=62° 1' 30"

which is the difference of longitude between Paris and Barbadoes. But the opportunity of determining longitude by celestial observation that most frequently occurs, is that by the occultations, or passages of a star behind the disk of the moon, and this may be observed with great accuracy. It is only necessary to find the moment when the centre of the moon is in conjunction with the star; this fixes the position of the moon, and the difference between this and the time of the Nautical Almanac, is performed as before, and you have the longitude. It is easily comprehensible that it is noon to all on the same meridian at the same time, and that all other persons on other meridians will have their noon, sooner or later than on this, as they are east or west of this; and the difference between the relative times of any two meridians, is always proportioned to, or rather equal to, the difference of longitude, or it may be said that the time is the measure of the longitude. (TO BE CONTINUED.)

Elementary Schools in France.

BEFORE the Revolution in France, the government did nothing for the sustentation of public elementary education. It is true, there were schools in the towns and villages, equal perhaps to the education of one-fourth of the children, supported principally either by the religious orders, or by benevolent individuals. It is also true, that the revolutionary government recognized the schools as under the care of the states; and in 1791, a law was enacted, establishing free schools for all the people, providing for their instruction in those branches considered indispensable; such as reading, writing and arithmetic. This liberal enactment was not carried into effect throughout the country. The delays incident to a want of teachers, a new organization, and to a disturbed condition of the government, prevented the accomplishment of the purposes of the law, during the nine years that it remained upon the statutes of the realm. In 1802, a new system was adopted by the National Assembly, including primary schools, lyceums and special schools. In this new regulation, the *first* and most important part, (the primary

schools,) was left to be supported by the people, while the lyceums and special schools were taken under the patronage of the government. Primary instruction was not well sustained, or much encouraged, during the reign of Napoleon. It was not until 1816, that a royal ordinance declared that every commune must support a school for the gratuitous education of all its children. This royal ordinance did not, however, equal the emergency of the case. Lancasterian schools were established in several of the populous communes, but a majority of the youth of the nation was not yet reached, even by this effort of royalty.

In 1830, the number of men subject to the conscription, was 294,975, and of these only 121,079 could read and write. In 1831, M. Cousin was commissioned by the government to examine the German schools. His report on the Prussian system of instruction, which has been translated and extensively read, both in this country and in England, induced the adoption of that system, as the basis for the elementary instruction of France. A law was passed in 1833, providing for the establishment of one school in each of the 37,263 communes of France, within six years, the crown agreeing to pay one-third of the expense. The teacher's salary is raised as follows: the commune furnishes him with a house and garden, if he has a family, and board if he is single, and a salary of not less than 200 francs, and he is allowed a small tuition fee from the scholars, the amount of which is regulated by a school committee.

A normal school in each department is established for the supply of well educated teachers, who come under obligation to follow teaching for at least ten years, and this exempts them from conscription for the army. Children are admitted to the primary schools at six years of age. It ought, perhaps, to have been stated, that these regulations apply only to boys' schools, the communes having constantly refused to support girls' schools, even when the government offers to pay one half of the expense of them. Attempts have recently been made, with but partial success however, to organize communal committees of ladies, to establish and supervise female and infant schools, similar to those for the other sex. There is no penal or compulsory law, as in many of the German states, to

enforce regularity of attendance; and there are many parents who never having enjoyed the benefits of education themselves, seem to have no proper appreciation of its value; still the responsibility recently assumed by the state, argues well for the people of France. M. Guizot, in a communication to the Chamber of Deputies, says, that "the law divides primary instruction into two degrees, elementary and superior. The first may be regarded as the *minimum*, below which it must not descend,—the strict debt of the country towards all its children. This must be common to town and country, to the poorest village and the stateliest city; wherever, in short, there exists a human creature on the soil of France; it is what is strictly necessary to the dignity of human life, and the protection of social order." This appears to be admirable theorising. But is there not some inconsistency in proclaiming the absolute necessity of universal education, obliging the people to furnish the means, and then leaving it optional whether they will receive and enjoy the benefits? Do not the unhappy children of the manufacturing towns, call for some enactments in their favor in regard to the necessary *time*, as well as the means of education?

There are three distinct methods of instruction in France. They are distinguished as *individual*, *simultaneous* and *mutual*. Individual instruction is when one person is heard and examined at a time. This method of instruction does not seem to have found so much favor with the public in France, as its adaptation to the peculiarity and development of mind would seem to demand. The number of teachers, and the consequent expense attending this mode of instruction, interpose an almost insuperable objection in the popular, or communal schools. It seems only suited to private instruction, or to very small schools.

The simultaneous instruction is more commonly adopted than any other in the rural communes, where the schools are not large. This method answers well, where the scholars are very nearly of the same grade of acquirement. It does well in properly organized classes, but it fails in a mixed school of various grades, if the teacher undertakes to keep the whole school, for any length of time, engaged in the same exercise.

The other method is the mutual instruction known in

this country as the monitorial, or Lancasterian method of instruction. The preference claimed for this system is, that it is economical, the master being reduplicated, or multiplied in his monitors. This mode of instruction, which has been gaining ground for several years, and innovating somewhat upon the methods of instruction which had been in use, under the influence of the clergy, from time immemorial, was objected to, and formally proscribed by the *theocratic* party in 1824; the supervision and power over the schools being then with the bishops. Schools for mutual instruction under this *regimé* were closed, and remained closed for four or five years. Since the renovated government came into power, the mutual system has been gradually gaining again, especially in the large towns.

There are several benevolent societies that have co-operated with the government, in furthering the cause of elementary instruction; particularly one in the city of Paris, which goes in favor of the mutual instruction system. Without the powerful aid of this influential society, this mutual system would have sunk under the preconcerted opposition of large classes of both ecclesiastics and laity. M. Cousin, the minister of public instruction, joined in condemnation of this method.

The common schools, which are denominated primary in France, extend their course of instruction to reading, writing, arithmetic, geography, moral and religious instruction, and music. All beyond these studies, which are taught in our common schools in the United States, would in France be reckoned as belonging to the secondary instruction.

The great advance which has been made in the introduction of a system of elementary instruction, under the patronage and supervision of the government of France, forms an epoch in the history of education. M. Guizot, in introducing the bill to the Chamber of Deputies, remarked, that "the experience of nations demonstrates that education cannot be safely left to the only sound law of all trade, that of free competition, as those who need it most will feel it least; and thus, the most sacred demand of a people remains without any security for its supply." He objects to giving it over entirely to the local subdivisions and authorities of the state,

because some would be unable or unwilling to meet the expense of an effective system.

With regard to supervision, there are district or communal committees for each school, and then a more general committee for each arondissement, and for the purpose of extending improvements, and promoting unity of method and purpose in the schools, an inspector is appointed for each department of France; and in regard to supervision, the minister of instruction, M. Guizot, has exhibited great ability and good common sense, that ought to commend his opinions and doings to the favorable estimation and imitation of the authorities that have the appointment of school officers and superintendents in this country. He says, that "*positive and technical knowledge of the various matters on which the examination turns, is absolutely necessary; and it is not sufficient to have such knowledge; it must have been proved to exist, in order to give to these examinations the requisite weight and authority. For these reasons, the members of these commissions ought to be, in a great part, men specially qualified;—men familiar with the business of tuition. It is evident that primary instruction rests entirely on these examinations. It is necessary, then, to compose these commissions with the most scrupulous severity, and to appoint only persons versed in the matter.*"

M. Guizot, like all the distinguished ministers of instruction in France, had the discernment to see the propriety of having men at the head of educational matters, who had been educated with reference to the discharge of the duties of such position. He judged that the immediate supervisors of schools ought, as well as the teachers, to be acquainted with the details of instruction—that the business of teaching is a profession, and the intermeddling of ordinary laymen in the details of a school-house, has not, in general, tended to the improvement of the condition of a school.

In the celebrated Normal Schools for primary instruction, the course prescribed embraces two years; the first year is devoted to the elementary studies required in the ordinary course in a primary school. The methods of instruction most generally directed to be made are the simultaneous and the mutual. The second year's course is considerably more liberal and extended, and

embraces linear drawing, geography, history, mapping, morals and religion, vocal music, elementary physics, terra culture and pedagogy.

Religious instructions are given by an ecclesiastic twice a week, but dissenters are allowed, if they choose to withdraw, to receive their theological impress elsewhere.

Physical education is conducted by means of exercises in gymnastics of various kinds, especially in higher and primary Normal Schools.

We learn from a communication from the *Societé pour Propagation connaisances Scientifiques et Industrielles*, addressed in the year 1830 to the Society for Diffusing Knowledge, in London, that until quite recently, good books were generally wanted in the primary schools. That the "insipidity and absurdity of a greater part of those used, are really disgusting." But for some time past great progress has been made in writing books adapted to the comprehension and condition of the children who frequent the primary schools. These books consist of small elementary treatises on different useful arts, and of short stories, which present good moral lessons in an ingenious and interesting form. Among works of this latter description, we may mention the delightful little books of M. Laurent de Jussieu, which, however, are not very extensively used in schools." There is also an appropriation from the government for the supply, to limited extent, of books.

But notwithstanding the provision and enactments of the government, a late writer informs us, that out of the 5,000,000 children of the age to attend primary and other schools, not more than 2,000,000 are now in the process of being educated; and that at least one-third of the adult people in France can neither read nor write. The liberal ministry, who for some years past have shewn themselves solicitous for the enlightenment of the masses in France, in providing funds and establishing communal schools, have nevertheless thought it inconsistent with the freedom of the citizen, to pass compulsory enactments to enforce attendance of the children in the schools. M. Guizot, however, foresaw, or feared, that the purpose of the government would fail with respect to large classes of people, who having no education themselves,

do not prize for it their children; and thought that education ought to be excepted from the general principle of voluntary system, because as a general thing, those that need it most value it least. There is also another class, who oppose universal education in elementary branches, and contend that it would be injurious to the respectable classes, inasmuch as it would elevate the peasantry above their condition, and make them conceited and aspiring;—that by elevating the substratum of society, the foundations of the government and laws might be disturbed, and perhaps whelmed in ruins. Sufficient answer to these groundless fears is furnished, it was contended, in the experience of Scotland, Holland, and the United States. If a person were asked to name those countries where obedience to good and wholesome laws, forethought, enterprise and industry most prevail, these are the very countries that would be named.

Though very much yet remains to be done in France, yet it may be said that much has been accomplished, within the present century, for the diffusion of primary, or elementary instruction, among the poor and laboring classes. The enlightened ministry of that wonderful country have considered the subject in all its importance. They have seen that the fostering care of the government, which in former periods has been liberally bestowed upon secondary and superior instruction, must be brought down to the primary schools; and this cannot be effectively done until the following regulations are in force, viz:

1. There should be a sufficient number of Normal Schools to educate masters.

2. The primary instruction should be gratuitous to all the indigent.

3. Superannuated teachers should be allowed a pension or annuity from the government.

4. There should be an enlightened board, practically acquainted with the business of teaching, to examine and license teachers.

5. The best methods of instruction should be encouraged.

6. To reading, writing and arithmetic, should be added instruction in those branches which are necessary to intelligent and skilful workmen.

7. The government should cause books to be written and circulated, better adapted to the comprehension of children; such books as would tend to form the reasoning powers—to impress upon their minds good religious principles, free from fanaticism and superstition, taking care to instil sentiments of honor, humanity, patriotism, and submission to the laws.

Monitorial Instruction.

THERE are two great societies in England, which, in the absence of any governmental supervision and support, have assumed the duty and privilege of educating the poorer classes of the people. These societies are known and distinguished as the "British and Foreign School Society," and the "National Society." The Lancasterian, or Monitorial system, which they have adopted, and which is known on the continent as the mutual instruction system, has had among a certain class of benevolent men, who have not studied very deeply the philosophy of the human mind, a remarkable popularity. As almost every great discovery or invention, in the progress of its success, brings out sundry claimants to the meritorious parts of the system, so it was in the case of the monitorial system of instruction. There have been many and warm discussions, with regard to the origination of this system. It is claimed on the one part that Dr. Bell originated the plan, and fully tested its merits at Madras, as early as the year 1789, and eight years afterwards published the result of his trial and experiment. Public attention was afterwards called to it in England, by that enthusiastic and benevolent teacher, Joseph Lancaster. Principally through the zeal and exertions of this individual, the British and Foreign School Society was formed, and went into operation in 1805. Six years after, another society was formed with the same object, and took the name of the "National Society for promoting the Education of the Poor in the Principles of the Established Church, throughout England and Wales." The British and Foreign School Society has from 70,000 to 80,000 pupils. The Normal School Society has probably 400,000 pupils. Each

has a model school. The British and Foreign is in the Borough Road, Southwark, and the National, at Westminster. Each teaches reading, writing, arithmetic and the scriptures, and in the National Schools the Church Catechism. The Borough Road School is well managed, and is much visited by those who wish to see this system of instruction in its greatest perfection. Young men in process of training for teachers in this system, resort to this school, and go into the classes as *pro tempore* scholars, obtain charge of a low class, and rise *seriatim* to the highest, when they are ready to be graduated as teachers. Scholarship of a high order is, therefore, not to be expected in schools of this description.

The leading consideration with regard to the Lancasterian system of instruction seems originally to have been, how can the greatest number be taught at the least possible expense? This seems to have been the inquiry in England. Not as in Holland, how shall we furnish the best instruction to all the rising generation? Bell and Lancaster, with their friends, reasoned that, in a densely populated country, in which the poor are numerous, it would be next to impossible to have all the children taught without some labor-saving machinery, like the monitorial system. By reference to Holland, the fallacy of this conclusion may be seen; there is scarcely another country more densely populated than Holland. "In Harlaem," says President Bache, "with a population of 21,000, we were informed that there was not a child of ten years old, of sound intellect, who could not both read and write;" and yet the monitorial system has never found any favor in Holland. The prejudice is strong against it. A comparison between their schools and those of England, produced this general dislike. A prize was offered a few years since for the best dissertation on the subject, by the "Society for Public Utility," and taken by M. Visser, inspector of schools in Friesland. This incomparable dissertation was widely distributed, and no doubt materially contributed to form and confirm the opinion that universally prevails to this day.

Teachers in Holland are numerous, and the schools comparatively small;—the teachers' salaries are partly from the government, and partly made up of fees from the scholars, and yet these

teachers are well supported, and their functions are held in estimation. There are no scholars taught gratuitously, except such as the parents declare themselves unable to pay for; the Hollanders judging that *that* which comes too cheap is generally little esteemed.

We doubt not that many have become advocates of this monitorial system from pure benevolence, because they thought they saw insurmountable difficulties and expenses in giving a common education to the masses on any other plan. These good people wanted the world enlightened, and here was a newly discovered panacea against ignorance, which was cheap, and everywhere to be had. Father Girard, the benevolent founder of the system in Switzerland, told Mr. Woodbridge, the original editor of the "Annals of Education," that when he met with a difficulty in explaining any word or subject, he often called in a boy to aid him, and had usually found him succeed entirely, even when all his own efforts had failed. And Mr. Wood, of the sessional school of Edinburgh, relates that when a learned mathematician came to his school, and suggested an improved method of working one of the rules of arithmetic, "being unable sufficiently to comprehend the explanation, I called," said he, "one of the best monitors, who, after three or four explanations, succeeded in comprehending the method, and went and taught it to others, very much his inferiors, in so lucid a manner, that they grasped the subject at once," and Mr. Wood says, he could not understand it until he heard it from the boy!!! There are some boys of remarkable acuteness of perception, and of surprising ability at illustration—such ought to be trained for teachers. In order to show the opinions of several distinguished writers on educational subjects we make the following extracts.

The Hon. Horace Mann says, in his seventh Annual Report to the Board of Education of the State of Massachusetts:

"I saw many Lancasterian or Monitorial schools in England, Scotland and Ireland; and a few in France. Some mere vestiges of the plan are still to be found in the 'poor schools' of Prussia; but nothing of it remains in Holland, or in many of the German States. It has been abolished in these countries by a universal public opinion. Under such an energetic and talented teacher as Mr. Crossley, of the Borough Road school, in London; or, under such men as I

found several of the Edinburgh teachers to be, and especially those of the Madras College at St. Andrew's, the monitorial system,—where great numbers must be taught at a small expense,—may accomplish no inconsiderable good. But at least nine-tenths of all the monitorial schools I have seen, would suggest to me the idea that the name 'monitorial' had been given them, by way of admonishing the world to avoid their adoption, One must see the difference between the hampering, blinding, misleading instruction given by an experienced child, and the developing, transforming, and almost creative power of an accomplished teacher: one must rise to some comprehension of the vast import and significance of the phrase 'to educate,'—before he can regard with a sufficiently energetic contempt that boast of Dr. Bell, "Give me twenty-four pupils to day, and I will give you back twenty-four teachers to-morrow."

M. Cousin, in his Report on the State of Education in Holland, observes:

He asked me how we got on with our system of mutual instruction. 'Do you expect,' he said, 'that by such a mode of tuition, the instruction given in the primary schools will ever form men? for that in truth is the real purpose. The different things taught in school are but means, and their whole value depends upon the degree of relation they bear to that object. It never will be attained, unless the system of mutual instruction be given up; it does very well for the purpose of conveying a certain amount of information, but it will never *educate* the pupil, and, I repeat it, education is the object of all instruction.'"

It may be imagined with what satisfaction I listened to such sentiments, coming as they did, from the mouth of so competent a judge as Mr. Van den Ende. 'Nothing is more clear,' I replied, 'and both as a philosopher and a moralist, I maintain that simultaneous teaching (individual tuition being unattainable) is the only method that is suitable for the education of a moral being; but I am obliged to confess it, the system of mutual instruction is still popular in France, to a degree that is truly lamentable.' 'How does that happen,' he said, in a nation so intelligent as yours?' 'From a fatal circumstance.' I replied, 'the consequences of which still continue. Under the restoration, the Government tried to place the primary schools in the hands of the clergy, and the resistance made to that scheme carried things to the opposite extreme. Some well-meaning persons, but men who did not look below the surface of things, and were utter strangers to the subject of public instruction, having by chance visited some of those semi-barbarous manufacturing towns of England, where, for want of any thing better, they are too happy to have Lancasterian schools, mistook for a masterpiece of perfection, that which is only the infancy of the art of teaching; and were dazzled with the exhibition of vast numbers of children taught by one master, assisted only by little monitors, chosen from among the pupils themselves. Seeing children thus governed by children, they found a species of self-government, which they thought would be a useful preparation for the infusion of the democratic principle; and as it is obvious that a Christian education is impossible under such a system—for what monitor, even of twelve years of age, can give instruction in religion and morals?'—they saw that the religious education amounted to nothing, unless the dry repetition of a catechism, such as we might expect

to find in Portugal or Spain, can be called by that name; and this they viewed as a triumph over the clergy. Other persons were pleased with the system on account of its cheapness, and then the eye was caught by the mechanical order and precision in the school exercises, the children went through their evolutions, according to a signal given by a child, as the different parts of the machinery in a factory are set in motion by a crank. This mechanical instruction was first set up in opposition to the Church schools of the restoration: thus one extreme produces another; the domination of Churchmen and despotism having equally unfavorable tendencies. Unhappily, the system of mutual instruction survived the struggles which preceded the revolution of 1830, but simultaneous instruction is gradually making progress, and the eyes of honest and disinterested persons will be opened.' I added, that I had not met with a single schoolmaster in Germany, who was favorable to the system of mutual instruction; and that I had not seen one school so conducted, either at The Hague, or at Leyden. 'Nor will you,' replied Mr. Van den Ende, 'in any other part of Holland;' a remark in which he was fully supported by Mr. Schreuder, to whom he appealed for the truth of it. 'And this by no means arises,' he continued, 'from our not being sufficiently acquainted with that system; we have studied it well, and it is because we have studied it, that we have laid it aside. The Society for the Public Good, with which you must be well acquainted from the report of M. Cuvier, gave a prize for the best essay on the advantages and disadvantages of the two systems; and in the work to which the prize was awarded, the system of mutual instruction is analysed in its most minute details, and is proved to be unsound on every point which bears upon education in the proper sense of the term, the authority of the master, and the proper lessons to be inculcated. Mr. Visser, a school inspector, was the author of that essay.'"

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I was surprised to see a boy of twelve years old, in one of the passages in a primary school at Amsterdam, teaching the first elements of reading to some very young children. "Is that little fellow an assistant?" I asked—"No, he is one of the pupils in the school, belonging to the most advanced class."—"He is then a monitor," I replied, "and you adopt the plan of mutual instruction." "God forbid," said Mr. L'Ange, with a smile,—"but we are eclectic here; we do not prescribe any useful practice, to whatever general system it may belong. Thus, when a child is found to possess the talent of teaching, and intends to become an assistant, and ultimately a teacher in a primary school, (and you know that every school for the poor is a true normal primary school,) we see no objection to entrusting a pupil of this description, not to hear the lessons, in the more easy part repeated. In a case of exigency, children may be safely employed for the repetition of certain things; but the initiatory steps of all teaching require a master. Even our assistants, who are in fact masters, are not entrusted with anything beyond simple repetitions."

Our visit being over, we entered gravely into a consideration of the comparitive merits of the plans of mutual and of simultaneous instruction. "Are you well acquainted, sir," I said, "with the system of mutual instruction?—have you applied it in practice?—and what is your opinion of it?"—"We know it," he replied: "we have tried it, and we consider it as wholly insufficient for the object to be attained." "It is not," (I make use of the very words of Mr.

L'Ange)—"It is not a system which is calculated for moral and intelligent beings; and we do not admit the justice of applying it in a school for the poor, more than in any other school. For the poor have especial need of *education*, and you cannot *educate* by a plan of mutual instruction; you can *instruct* only by it, and that in so superficial, and in some respects mechanical a way, that it is no cultivation of the mind. At the time when Holland and Belgium were united, the Belgian liberals used to talk so highly in favor of that system, especially for large numbers of children, as in the schools for the poor, that our college of curators, who are attentive to every thing of consequence that is going on, which bears upon the education of the people, thought it their duty to make trial of the new system; and the result of that trial was, that the plan of simultaneous teaching is the only true rational mode of education. In one of their reports upon our schools for the poor, they have stated the reasons which led them to that conclusion."

The following passages, from that part of the report where this point is discussed, I earnestly recommend to the attention of every true friend of the education of the people.

"At Amsterdam the teachers are men of experience, and youths who have given proofs of a capacity for teaching; but in the Lancasterian schools in England, it is always children who teach. Now if it be true that the master who desires to teach with effect ought to be himself thoroughly well instructed, and be possessed of knowledge far beyond those whom he is to teach; if, above all, it be unquestionable that in order to teach any thing well, it is not enough to know it ourselves, but that we must have the art of imparting what we know in a clear, intelligible manner, adapted to the subject; it must be admitted that instruction, such as is conveyed at Amsterdam by experienced men, and by youths who are educating themselves to be masters, is infinitely preferable to the plan of one child teaching another.

"It is true that to maintain such schools as those at Amsterdam, a larger sum is requisite than for Lancasterian schools: but, on the other hand, the pupils in the former have the advantage of being taught by very able masters, who have had experience in teaching from their youth upwards; they have for their reading lessons several little works calculated to purify their hearts as well as store their minds; and they write from the first on paper, and so learn to form a good hand, and to write fluently. If our objects in the schools at Amsterdam were limited to teaching the children no more than what is taught in the Lancasterian schools, we might do very well with the apprenticed teachers and candidates only, and a great number of the books used in teaching to read, and for the instruction of the children, might be dispensd with; slates might be substituted for copy-books; and then the Amsterdam schools perhaps might cost less than those in England; and without giving up many things which are now taught in the latter schools. But, thanks to the munificence of the magistrates of Amsterdam, and to the liberality of its inhabitants; thanks also to the interest which both the one and the other take in the promotion of education, our schools have never yet wanted a sufficiency of funds to pay able and experienced masters, to supply good books to the children who are taught gratuitously, and to teach them to write, not on slates, but with pen and ink, and on good paper.

"Let it not be said that what is taught in the Lancasterian schools is sufficient,

and that we carry the education of the indigent classes too far in our own. If it be sound policy (and it does not appear to us that it is now considered so) to keep the lower orders sunk in ignorance, let education of every kind be given up; for an education which stops short at the first rudiments, is more dangerous and far more to be feared than a system of education carried on to higher objects. A man who is able to read and no more, may read books that will corrupt his morals or lead him on to acts of sedition; and for want of sufficient knowledge to enable him to reflect upon and justly appreciate what he has read, he is liable to be misled and carried away by mere external impulses. We repeat it, if we go so far as to enable the lower orders to read, we ought to give them at the same time the means of understanding and setting a just value on what they read; and this is what is chiefly aimed at in the education of the children of the poor in the schools of Amsterdam. All the books put into their hands, from the first elementary work, to those in use at the close of their education, contain precepts and examples of virtue, of wisdom, and of submission to superiors. They learn to read and to understand the history of their own country, and sacred history. Such reading lessons are better calculated than any thing else, to lead them on to the imitation of great and virtuous actions; the sole way of forming useful citizens. Further, (and this is another great advantage of the system followed in the schools of Amsterdam,) those among the pupils who show unusual talents have an opportunity of developing them, and of devoting themselves, by becoming apprentices to the instruction of youth. In consequence of this, a great number of those necessitous children have been able to extricate themselves from a state of poverty, and to rise to the condition of reputable citizens."

The Quarterly Review, on the several Reports of Committees, remarks:

There is another important discovery, at which wise and practised friends of popular education have arrived with almost perfect unanimity. The scheme of moral mechanics, which good old Dr. Bell and Joseph Lancaster, were thought to have brought to such exquisite perfection, under which education could be supplied on demand by a process simple, uniform, economical, has fallen unto slow, but general disrepute. That magic power of 'the monitorial system,' by which a single master (sometimes of moderate ability, and very moderate acquirements) could transmute three or four hundred dull, ignorant, and unruly children, into orderly, intelligent, and instructed classes—where the scanty knowledge imbibed by the few older or cleverer boys was transfused, by a spontaneous circulation, through the whole school—turns out at last, if not a delusion, at best a device of very limited efficacy. Although, in some of the lower departments—in some of the first rudiments of teaching, reading and spelling, the plan of mutual instruction may still find favor, and may indeed be of considerable use—we believe it is universally admitted that higher instruction must be imparted with higher authority than that of boys a few years older. Above all, the simultaneous inoculation of the whole school with the principles of religion, with the principles of the Church of England, by this general transfusion of the Catechism.

Education, to be of any real value, is a far more expensive process than was thought in the earlier days of Bell and Lancaster. Not merely is it possible—a

possibility which was hardly suspected in those hopeful times—that schools may be too large, and contain too great numbers; not only must the master himself be more highly trained and possess more varied knowledge than was dreamt of under the old monitorial scheme; not only must he have superior skill in attaching the boys to instruction as a privilege rather than a hard duty; not only must he acquaint himself far more intimately with the talents and dispositions of the individual boys—but he must himself feel and acknowledge that the greatest aptitude and activity in teaching have their limits. Mr. Cook, we observe, one of the government inspectors, would have no school of more than two hundred children. In a large school, the best master must have his assistant; his pupils must have teachers of a more advanced age, or those who have already received good preparatory training, and can therefore instruct with some gravity—with some authority."

'Mr. Belliars (of whose judgment, from his report, we should think very favorably) speaks less strongly, perhaps, than others against the monitorial system:—

'The children usually employed in this work,' he admits, 'are in age from eight to twelve years. For their labor, they receive no remuneration, and no extra instruction. The parents of the *teachers* complain, for they say their children lose a great portion of their time in teaching. The parents of the *taught* complain, for they say that the senior children are incompetent to fulfil properly the task assigned them, and that thereout their little ones receive damage. In some instances the justice of these complaints must, I fear, be admitted.'

He proceeds, however:

'That the monitorial system, properly carried out, (*i. e.*, when the monitors receive a remuneration for their labor, and instruction at extra hours.) is one of great value—in some cases absolutely necessary—few, I believe, will deny. At the same time I am disposed to think, that in many places where a child is seldom allowed to remain at school beyond the age of eleven or twelve years, when they are taken away by their parents to add what they can to the weekly gains of the family, and where, consequently, the first class is always fluctuating, it will be found very desirable to have regular paid and instructed monitors of riper age, or an assistant master, or an apprenticed pupil teacher, constantly trained and instructed by the master of the school."

We should likewise in justice refer to Mr. Mosely's satisfactory report on the Sheffield school, which is conducted on the monitorial system (p. 515.) On the other hand, writes Mr. Watkins, 'It is needless to say that we require more masters, or well-instructed assistants in all our large schools, before we can hope for any great improvement in the children.'—p. 290. And to the same effect, we might quote, page after page, from the government reports, and from almost every good work on popular education. Mr. Coleridge has well summed up the whole—'in practice the monitorial system too often does little else than conceal the indolence and insufficiency of the master.'

Vegetable Physiology.

A large portion of the scholars, in the common schools of our country, will spend their future lives in agricultural pursuits. It, then, becomes a question of some importance, whether a part of their time may not be profitably spent in investigating the laws of organic life, as developed in the vegetable world, and they be furnished with the knowledge, that will cause them to observe, with interest and delight, the various phenomena of nature, that are continually taking place around them.

Agriculture has as yet received but little aid from science. Some important facts and laws, in vegetable physiology and agricultural chemistry are known, and to a limited extent practised upon successfully; but the want of practical experience in the essentials of good husbandry, by those who have attempted to reduce to practice, scientific discoveries, has too often brought discredit upon all agricultural knowledge embodied in books. Some enterprising farmers will eagerly receive any information concerning the nature and habits of plants, and the conditions favorable to their development, whether that knowledge be derived from books from a scientific friend, or an experimenting neighbor; but many will be very cautious about deviating from the usages of their ancestors, without some practical illustration, which shall demonstrate to them the advantages of a change.

If those of our youth who intend to engage in agriculture, should be well instructed in vegetable physiology, and the results made known by agricultural chemistry, that information would be gradually blended with the knowledge they would derive from their own limited experience, and give them much greater skill and efficiency in cultivating the earth.

Our object is just to allude to a few facts, for the purpose of drawing attention to the subject.

The office and functions of the different parts of plants, are some of them quite obvious; many have been ascertained by repeated experiments and patient observations; while others have hitherto baffled the ingenuity of man to obtain their secret.

The roots fix the plant in the soil, and absorb from the earth

the greater portion of the moisture it receives. Contained in the water, and taken up with it, are carbonic acid and various solutions of earthy salts. At their extremities, the roots are soft and porous, so as readily to imbibe the moisture in contact with them. The force with which the roots absorb fluids is considerable.

A tree wounded in the spring of the year, before the leaves are sufficiently expanded to evaporate the juices that fill its tubes, pours out its sap profusely; and when the liquid is confined, the pressure is found to be very great. Advantage is taken of this circumstance, to obtain in the spring of the year the juice of the maple for making sugar. This action of the roots in absorbing fluids, is in accordance with that law of nature, by which two fluids of different density, separated by a permeable division, will pass through it, and mingle with each other. The amount of fluid passing each way is not the same; the quantity going from the more rare to the more dense being always the greater.

This action will continue as long as there is much difference in the density of the liquids. The juices of plants are more dense than water, and consequently more liquid passes into the roots, through their spongy extremities, than goes out through the same. The liquid that goes out of the roots is not pure water, but contains, mixed with effete matter, some of the peculiar substances formed by the plant, which are found in the descending sap. For instance, a pea or a bean grown in water disengages a gummy matter; a poppy communicates to it an opiate substance, and a spurge gives it an acrid taste. "The oak so completely impregnates the soil around its roots with *tannin*, that few trees will grow on the spot from which it has been rooted up; since this agent, even when a very minute quantity of it is dissolved in water, produces an effect like tanning upon the delicate tissue of the spongioles, and destroys their peculiar properties. It is probable that every species of forest tree produces a similar effect; since it is well known, that when a wood composed of one kind has been cleared by the hatchet or by fire, the new growth which soon springs up, is not of the same, but of a different kind. The excretions of all plants seem injurious to themselves, as well as to others of the same species, grown in the same spot; and in

many instances, as in those just stated, they are injurious to plants of other tribes also. But there are many instances in which they are absolutely beneficial to other classes of plants. Thus, most of the leguminous tribe exude from their roots a matter analagous to gum; and this product is beneficial to plants of almost *every* other tribe.

Hence, therefore, the benefit which the farmer derives from taking off a crop of peas between two crops of grain, is not restricted to the value of the peas alone, since the succeeding crop of wheat or rye is absolutely improved by this proceeding. And, on the other hand, the exhaustion of the soil by rank-growing weeds is not their only evil, since they impart to it some of their own injurious properties. Now, by following out this system, and ascertaining what plants form the most abundant, and at the same time, the most nutritious excretions, and which others are most benefitted by these,—keeping in view, also, the nature of the mineral ingredients they may respectively require, the agriculturist may hereafter be able to dispense almost entirely with artificial manure, as he has already done with the following system;—for he will only have to adapt his rotation to the particular soil, and then the excretions of one plant will serve as a manure to another."

A correct and definite knowledge of the amount and proportion, not only of the different ingredients taken from the soil by each species of plants, but of the excretions returned to it, is much to be desired; also, the modifications of the same which are produced by different kinds of soil. This subject is now receiving the attention of scientific men, who have flattering prospects of obtaining much useful and practical information on these points.

In the present state of agricultural knowledge, "as a general principle of guidance in determining the succession of crops, it is considered advantageous that a crop cultivated for its leaves or roots, should succeed one cultivated for its ripened seeds; that the cereal grasses should be succeeded by leguminous plants; and plants which form a compact covering on the surface, such as grain and legumes sown broadcast, by plants which only partially cover the surface, such as crops grown in rows sufficiently wide to admit of cultivation between. It may also be adopted as a rule,

that when land is to be subjected to a crop of the same plants for a number of years, as in permanent pasture, the plants composing the crop should be of several different kinds, by which means the excrementitious deposit of one species becomes the nutriment of another. Hence the propriety of sowing clover, ribwort, and other taprooted herbage plants among pasture grasses." The grains and other plants raised for their seeds, which have a small amount of leaves, rapidly exhaust the salts contained in the soil, while the pea, potato, turnip, clover, &c. abounding in foliage, derive their nutriment almost entirely from the atmosphere, and diminish in a much less degree the richness of the soil.

The object of the stem or trunk of plants, appears to be to elevate and expose the leaves, so that they may best receive the influence of light, heat, and air. Stems are of various kinds, from the smallest and most transient herb, to the largest and most enduring tree; but they are all included in two classes; one having its fibres arranged in a circular form, and increasing by annual parallel layers on the outside of the woody portion; the other, by having its fibres distributed at intervals through its whole substance, and not increasing by parallel layers between the wood and bark.

To the first belong all the trees and shrubs, with a large proportion of the plants of the temperate climates; to the second belong palms, bamboos, canes, and many other tropical trees, and some herbaceous plants of the temperate regions, such as asparagus, the lily, the grass, &c. Those trees of the first division, which are used for timber, are usually composed of two kinds of wood, a hard central portion, generally of a dark color, called heart-wood, and a softer portion surrounding it, of a lighter color, called sap-wood. The tubes of the latter afford free circulation to the juices of the tree, while those of the former are filled with resinous and other matter, secreted by the plant. This gives hardness and durability to the heart-wood, and renders it valuable to the mechanic and artisan.

The office performed by leaves, in the economy of vegetation, is an important one. In their structure they are so formed as to

expose a large surface to the influence of the air. Each leaf is composed of loose cellular tissue, formed on the midrib and its branches, and is covered with a cuticle nearly impervious to air or water. In the interior, the cells in which the juices of the plant circulate, are not compact, but so loosely connected as to present a large portion of their exterior surface to the numerous cavities within the leaf. The cuticle covering the leaf has numerous openings or mouths called stomata, communicating with these cavities. These mouths have the power of opening or closing, according to the presence or absence of light, the state of the atmosphere, or the condition of the leaf itself. They are always closed in the dark, and when both the atmosphere and plant are saturated with moisture, or both deficient of it. When closed, comparatively little evaporation of the juices of the plant can take place, or absorption of moisture from the atmosphere. The direct rays of the sun have the most powerful effect in *opening* the stomata, and diffused daylight possesses it in a less degree. No amount of *heat* avails to open them during the absence of sun-light. When the stomata are open, evaporation takes place rapidly from the plant. The surface of the cells exposed in the cavities of the leaf, are many times as great as the exterior surface of the leaf itself. Their sides are very thin, and easily admit the passage of air or moisture. As evaporation takes place according to the extent of surface, this arrangement is admirably adapted to favor that process. The amount of water taken up by the roots, and evaporated from the leaves of many plants, is equal to twice their weight daily. Liebig supposes the evaporation of this large amount of water necessary to introduce into the plant a sufficient quantity of the earthy salts, which are held in solution by the water in minute quantities. During continuous cloudy and rainy weather, from the diminution of exhalation, plants become dropsical and sickly, the circulation of the sap is retarded, and the functions of the plant are but feebly performed. The same hapens to most plants that grow in the shade. Hence we see the importance to the agriculturist of exposing his crops to the full influence of the sun's rays.

The sap which ascends through the woody portion of the stem,

while being concentrated by the evaporation from the leaves, receives a portion of carbon from the carbonic acid of the atmosphere, and becomes a nutritious juice, capable not only of maintaining the healthy condition of the plant, repairing its injuries, and forming entirely new parts, but also of producing numberless substances valuable to man, for food, for medicine, or for use in the various manufactures. As the ascending sap is nearly the same in most plants, and the exhalation from the leaves nearly pure water, varying but little in taste or odor, it is evident that the products peculiar to each plant, are generated in the leaf: that there the elements of wholesome, as well as poisonous substances, are brought into combination. After the process of elaboration in the leaf, the sap descends by the bark, and deposits its nutritious particles, where the growth of the plant, the perfection of its seed, fruit, or the products of its various secretions, may require. The particles of matter that have become useless, are rejected by the plant, and discharged from its roots.

The fact, that nearly all the solid matter of the vegetable kingdom, is derived from the carbonic acid of the atmosphere, was a few years ago unknown, and the time has scarcely passed when it was disputed; but the accurate experiments of vegetable physiologists and agricultural chemists have now set the question at rest, at least with scientific men. The fixation of carbon takes place in the green portion of the leaf, and is affected by the influence of sun-light. No artificial light, however strong, will enable a plant to decompose carbonic acid, and appropriate the carbon to its own use. The decomposition of carbonic acid, and the fixation of carbon during the day-time, purifies the atmosphere, by setting at liberty the oxygen of the acid. During the night, when this operation ceases, plants are found to *throw off* carbonic acid. Till recently, vegetable physiologists supposed this to be caused by a process analogous to respiration in animals, that is, that the wood was gradually but constantly renewed, and that the effete portion produced the carbonic acid given off.

Liebig, however, has ascertained, that the amount of oxygen absorbed, and carbonic acid given off, bear no constant relation to each other, as they would do' if the above-mentioned theory

were true. He has further demonstrated that the oxygen unites with the plant *chemically*, changing its essential oils to resins; and that the separation of the carbonic acid from the sap, is a *mechanical* one, and is in proportion to the amount of juice evaporated.

If plants derive the most of their substance from the atmosphere, it may be asked why one soil produces a more luxuriant growth than another. It must be borne in mind that various mineral salts, though constituting but a very minute portion of the substance of plants, are absolutely essential to their growth, and that a soil deficient in these, must necessarily be sterile. As different species of plants require different kinds of salts, or different proportions of the same, it must also be obvious that every soil will be better adapted to one class of plants than to another, according to the amount and proportion of salts it may contain. A rich mould also, by affording carbonic acid to the water taken up by the roots, supplies a portion of nourishment to the young plant, before it has put forth its leaves sufficently to obtain it from the atmosphere. And by supplying carbonic acid to the surrounding air, it afterward furnishes a greater portion of that element to the leaves, than they would otherwise be able to obtain.

A rich mellow loam likewise allows the roots to expand more freely than does hard and stony ground, and to obtain the nourishment afforded by a greater depth of earth, as well as larger area of surface. Soil of a proper consistency, is also favorable for the admission and retention of a suitable degree of moisture for the well-being of the plant; and the presence of water, air, and other gases, by facilitating the decomposition of the minute particles of earth, liberates an increased amount of the various salts so important to the vegetable world.

Without pursuing the subject further, we would merely ask, if it is not desirable, that some elementary instruction should be given in the common schools of our country, upon a subject which would be directly practical to at least three-fourths of those who attend them? And whether teachers, if thoroughly conversant with the subject, might not materially advance the interests of agriculture, by modestly suggesting useful hints to the practical farmer? The

preconceived opinions of the farmer should not be treated lightly, nor his practical knowledge undervalued, for it must always be borne in mind, that no theoretical or scientific knowledge, however true or important in itself, can dispense with the knowledge acquired by experience. Few individuals, however, would reject valuable suggestions, if made at an appropriate time, and in a kind manner.

New-York, Feb. 1847. J. H. B.

Common Schools of New-York.

The Albany corresphndent of the Courier and Enquirer has furnished to that paper an interesting synopsis of the elaborate annual report of the Secretary of State as Superintendent of Common Schools, from which we learn that the organized school districts are 11,008. The number of children in the State, between the ages of five and sixteen, (exclusive of the city,) 625,899, an increase since last year of 4485. In New-York 78,000.

The whole number of school children 703,390—an increase since last year of 12,485. Of these only 4198 attended school, the whole year, and 200,626 attended less than two months. 141,255 learned vocal music; 1361 studied mental philosophy; 16,400 studied chemistry; 9700 studied physiology; 1900 book-keeping. There are over 11,000 colored children between five and sixteen, not one-fourth of whom received instruction at separate schools; and their attendance at the district schools is limited.

Of the school houses, there were 9007 visited—of which 8231 are of framed wood, 575 of brick, 604 of stone, and 598 of logs, and few results, more than this, show the great improvement in our State from preceding years. 3181 were furnished with suitable play grounds.

The compensation paid to male teachers averages $14. 16 per month—to female teachers $6,75, exclusive of board. The highest wages paid to males $26—to females $11. No wonder the schoolmaster goes "abroad," if this is his best estate. 1261 teach-

ers above 30 years of age—1522 under 18—chiefly females. Only 375 had taught the same school three consecutive years. The whole amount paid from public sources for education $1,191,607 70. Of this $55,000 is for District School Libraries. The whole capital of the Common School Fund is, in productive property, $2,133,943—unproductive, $163,800.

Of the productive, I see that 50,000 is in Manhattan Bank stock; $115,500 in stocks of this State. In the unproductive, is 237,734 acres of land—up in the Hamilton county district, I believe—*capital* for sportsmen, not for schools.

The number of volumes in the School District Libraries is 1,203,139—over a million of volumes.

The subject of "religious books" has drawn from the department these rules.

No books written professedly to uphold or to attack any sect or creed in our country, claiming to be a religious one, shall be admitted.

Works abounding in direct attacks on religious sects, though written for other purposes, are excluded.

But standard works, incidently betraying the religious bias or opinions of the author, not to be excluded.

A page or two of the report is devoted to supporting these rules.

There are 984 Indian children—Oneidas, 59; Onondagas, 169; Tuscowa, 63; Buffalo, 117; Cattaraugus, 121; Cayugas, 21; Allegany, 227; Tonawanda, 124; St. Regis, 81. It is a remarkable fact, that among the Indians in our State during the last year, the births and deaths were exactly equal—121 births, 121 deaths.

College Education.

The season has arrived when the several colleges send forth their annual catalogues, containing the names of the officers and students, the requisites for admission, the course of study and other information necessary to be spread before the public. Any one who carefully examines these catalogues, will be struck with the great similarity of the several colleges, in all their arrangements; the course of studies

continued through four years, embracing the same subjects in all, with only some slight variations in the text books. It is indeed singular, that in this land of experiment, no college has been organized upon a different plan. Each new college has been fashioned after the old model, as if no improvement was possible. The four classes, the fixed course of studies, the yearly advancement from one class to another, originally copied from the preparatory schools in England, are found in all.

We do not propose in the present article to offer any new plan for a college, but simply to point out some obstacles in the present system, which stand in the way of the usefulness of institutions, so important to the literary character of our country.

It has frequently been a subject for complaint, that our colleges send forth so many superficial and defective scholars; and some reform in the system of instruction, or other change, has been loudly demanded. Some have recommended changes in the course of study, so as to allow each student to pursue that branch of science most congenial to his taste, with the hope of making the pursuit of knowledge so inviting, as to secure the requisite amount of application. Some, again, have urged the institution of prizes and honors as stimulants to industry; and others have demanded of those entrusted with the government and discipline of these institutions, a more rigid administration of discipline. All these methods have been tried, and still our colleges remain substantially as they were, and annually send forth a multitude of young men, who have acquired nothing during the four years' course of study, but a few general ideas, together with habits of desultory application and superficial investigation. The remedies applied have failed of the desired effect, because the real evil is neither in the studies, nor the want of incitement to study, nor in the want of such discipline as the system admits.

In the first place, the freedom of choice in studies is of little importance, for at the age when a majority of young men enter college, the freedom of choice is not exercised so much upon the different branches of study as upon the alternatives of study and pleasure; and experience has shown that those who would not be industrious when pursuing a fixed course of study, are uniformly found making choice of those studies, which promise the least amount of labor. The difficulty is not to induce them to pursue a particular branch of study, but to induce them to study at all. At no period of life is continued application so irksome, or idleness and pleasure so attractive, as between the ages of fourteen and eighteen. That is the period of the most rapid growth of the body, and the most marked development of the passions; a period when the health, both of body and mind, require the most assiduous

care; and when least can be expected from the attractions of knowledge, in the way of securing application to study. It is, as every one who has reared a family knows, the thoughtless, the reckless, the indolent period of life.

In the second place, prizes and honors are well as far as they go, and cannot well be dispensed with; yet they have little effect upon the great mass of students. A few trials will show who are to be the successful competitors, and the remaining portion of the class are left to the influence of the common motives to application. Prizes and honors may be useful in producing a high grade of scholarship in a few, and thus elevate the standard of attainment in a college; but the great majority of students cannot be stimulated to exertion by the promise of honors and rewards, which they can have no hope of obtaining.

For those, then, who are too dull or too indolent to aim within the range of prizes and honors, and those for whom knowledge has no charms, there is nothing left but regard of discipline. But discipline is administered under great disadvantages in an American college. The laws are, indeed, sufficiently strict and severe, but there are no facilities for administering them effectively. By these laws students are required to occupy rooms in the college buildings, unless specially excused, to lodge in them at night, and be constantly in them during the hours appointed for study. For convenience in enforcing these regulations, the buildings are generally so constructed, that from twelve to sixteen rooms open into the same entry; and an officer of the college, commonly a tutor, occupies one of the rooms, and has the supervision of the remainder. But the utmost vigilance on the part of the tutor, will not enable him to secure a strict observance of the laws. Students can pass from one room to another, or go out of the building without his knowledge; unless, indeed, he were to stand sentry in the hall. They can assemble together for conversation or amusement, provided they keep moderately quiet; they can, and frequently do, collect together, to read over their Latin and Greek lessons, the best scholar in the group performing all the real mental labor, and the others deriving less benefit from the exercises, than if they used a liberal translation. Every method which ingenuity can devise to lighten the labors of study, and yet appear passably in the recitation room, can be resorted to without interruption from the tutor. The consequence is, that the law requiring students to be in their rooms and attend to their studies during study hours, becomes practically no more than this: students are forbidden to make any noise, which might annoy the tutor, or disturb those who are inclined to study. In practice, the attempt to compel an attention to study by a supervision of the rooms,

has long been abandoned, and the recitation room is made the arena of discipline, the tribunal where the application and industry of the last two hours' study is to be tried.

To an experienced teacher, the manner of the recitation reveals, in some degree, the character of the last two hours' study, and yet he is often at a loss to determine whether the blunders of the recitation room are the results of indolence or stupidity. There will be cases so marked as to leave no doubt of their being fit subjects for punishment, but many will aim only at that degree of attainment which will allow them to escape without marked censure, and which, for want of accuracy and thoroughness, will be of little practical use. Nevertheless, all the discipline of a college, which acts upon the industry of the student, must depend upon the daily recitation, and the examination at the end of the session; mostly, however, upon the former, for the examination is too remote in the mind of an indolent boy, to induce much exertion till within a few days of the ordeal. Yet a little reflection will show how difficult this discipline of the recitation must be. All that the instructor can require, is a knowledge of the lesson. How this knowledge was obtained, whether by intense and persevering study, by desultory and irregular application, by the aid of another and a better scholar, or by literal translations, he has not the means of knowing; and could he know, he has not the power to enforce that kind of application which will tend to invigorate their minds, and lay the foundation of good scholarship, in good habits of study.

He has still another difficulty to contend with. A number of students, of various ages, capacities, and degrees of preparation, (for whatever standard a college may assume for the terms of admission, there will always be some below that standard,) are put into the same class, and are designed to go through a few years course of study together. It is impossible so to regulate the studies of a class, as to keep each member employed to advantage on his lessons. The lessons must be graduated to the medium scholars of the class, and are not long enough to keep the best scholars employed, and too long for the poorest to master thoroughly in the allotted time. By this means the former are in danger of forming habits of idleness, and the latter are little benefited by their industry; while their defective recitations lower the standard of attainment for all the indolent members of the class, who will not fail to take credit to themselves, as long as any rank below them. The instructor may discriminate, and discipline those whom he is persuaded do not come up to the measure of their ability; he can make the recitation room exceedingly uncomfortable to those who come there badly prepared; but there is a limit to the effect of this, unless it is followed in some cases by the severe discipline of dismission. The

dread of dismission for deficient scholarship, where this punishment is frequently inflicted, will secure a certain amount of application; but it can never create in the mind of the student that interest and zeal in his studies, which are essential to success. The discipline of the recitation and examination rooms fails of its effect, because the previous discipline of the study room is wanting. The latter permits, I might rather say, encourages negligence, the former punishes it, often to the ruin of the individual, and with little benefit of his class.

Something can be effected by a judicious blending of discipline with rewards, and bringing parental and public approbation and disapprobation to bear upon the students, together with the exercise of a strong personal influence on the part of the instructors. It is upon these means that the judicious instructor mostly depends. But even these are applied to boys in college under great disadvantages. Rewards, as has been before remarked, are operative only on a few. Parents cannot be made acquainted with those little aberrations from the line of duty, which, if persevered in, as surely corrupt the mind and the heart as the grosser offences. Even the officers of the college may be ignorant of them, till their effects begin to appear in gross negligence and immorality. The parent reviews the report of his son's conduct and proficiency at the close of the college term, but he knows too little of college life to comprehend it fully. He finds that his son has not secured the approbation of his instructors, and he is disappointed, but he knows not what remedy to apply. His admonitions are of great importance, and may do much to correct the evil; but his son, a lad of fifteen, perhaps, has learned in college that he is a man, and that it is puerile to heed the admonitions of his father. The father, too, instead of blaming his son, may feel that his negligence or misconduct is the result of unfaithfulness on the part of his instructors, or pressed with other cares, may have little leisure to attend to such matters. He has committed the education of his son to the college, and holds it responsible for the result.

Public opinion has little influence upon those students who most need its restraining power. The college has a public opinion, a standard of excellence, and a code of morals of its own; and the tyro soon learns to disregard the good opinion of those without, provided he does not incur the censure of the great body of the students, and can win the applause of the clique with whom he associates. If he becomes acquainted with the inhabitants of the town in which the college is located, it is often with those who are easiest of access; with vain, frivolous persons of his own age, who will rather encourage him in idleness and dissipation, than exercise a conservative influence over him.

The personal influence of the officers of college is also impeded by the

peculiar relation which they sustain towards the students. Every man who has had a family to govern, well knows that there is a period in youth when it becomes impatient of control; when the pursuits of pleasure are most ardent, the passions strong, and the moral sense weak and irresolute; when it is necessary to make the boy feel that he is still a boy, and incapable of judging and acting for himself. It is precisely at this wayward period of life, that the lad is sent to college, and placed under the government of men whom he knows can have no personal interest in his welfare, and at the same time invested with all the prerogatives of a young man. With the self-conceit consequent upon his elevation, he feels himself in all points, except the single one of literary and scientific attainment, fully equal to his instructors. He acknowledges in them no right of control, farther than is given them by the statutes of the college; and even these he feels himself under no moral obligations to obey. The impossibility of executing some of the laws strictly, leads him to claim a like license in all, and henceforward he stands in the position of personal hostility to the officers of government, whom he regards as imposing restraint upon him for their own interest only. His whole college life becomes a kind of reluctant yielding to authority, a submission to an irksome discipline, to be endured only for the sake of gratifying his parents, or for the distinction which a college education affords. In the mind of such a student, everything is associated with discipline and restraint. He studies by constraint, goes to the recitation and lecture by constraint, and every escape from duty he deems so much taken from his task. It is extremely difficult for the most accomplished instructor to inspire anything like enthusiasm for learning, in minds so disposed; and it is not surprising, if, after many discouragements, he leaves them to get along as they may, and addresses himself to those who, from riper age, and more efficient early training, are better prepared to profit by his instructions.

I would not say that all, or even a majority of the students in our colleges answer fully to the above description; but the number is large enough to lower materially the standard of attainment, and give just cause for the complaint, that these institutions send forth so many superficial and inferior scholars.

On a careful examination, we shall find our colleges still more deficient in the means for the correct moral training of young men. So far, indeed, from affording the means of efficient moral culture, we fear that they offer peculiar temptations to vice. A parent is content if his son does not deteriorate in college; he does not expect him to make any progress in virtue and piety. Many a broken-hearted father can bear witness to the dangers of college life, and many a ruined man may find the cause of his ruin in habits contracted while obtaining his education.

Youth is, indeed, the most critical period of life; and there is danger, wherever it comes in contact with temptation. Perhaps the proportion of young men ruined in college is not greater than in other situations in life. There is a fearful loss of character among the clerks in our large cities, among those apprenticed to the various mechanic arts, and a greater still among those who are not trained to any business at all. In looking at the wreck of moral character among these, we might consider college comparatively safe. Of clerks and apprentices, it is estimated that one-half, at least, are ruined. The proportion of students is less than this; but the difference is owing more to the difference in their pursuits, than to any peculiar security which the college affords. Nearly all our colleges are situated in the vicinity of large towns, which have within them all the sources of iniquity which belong to the largest cities. There, may be found eating and drinking-houses, from the genteel lunch and hotel, down to the most loathsome dens of vice; gambling-houses, and houses of ill-fame approached by secret passages, unknown to the public, but easily found by the initiated. In addition to this, private rooms can always be hired by clubs of young men, in obscure places, for the purpose of private dissipation. And then there are amusements of some kind almost every evening; concerts, balls, shows, and comic exhibitions, to turn the minds of the young from serious pursuits, and prepare them, by a kind of mental dissipation, for the seductions of vice and folly. And what is there in the discipline of college to counteract all this? Nothing but the personal influence of the officers of instruction and government. They may counsel and advise, but they cannot control. They may check, in a degree, the frequenting of public amusements, by requiring students to be in their rooms in the evening; but unless the rooms are visited several times in the evening, they cannot prevent it.

A taste for amusement is incompatible with good habits of study; and a student who cultivates it, soon loses his relish for intellectual pursuits. His studies become an unsupportable task, and he neglects them; but something must be found wherewith to fill up his vacant hours, and failing to find sufficient amusement in public, he resorts to books, which inflame his passions and undermine his virtue; or he indulges in smoking, drinking, and other secret vices, which destroy his health, or corrupt his moral feelings. Nor is it possible for the officers to keep the evil-disposed student from scenes of riot and excess. The law, indeed, requires him to be in his room at a reasonable hour, and lodge there at night; but there are no adequate means of enforcing this salutary law. He may steal out, and elude the vigilance of the officer, and return again without his knowledge. He can leave his room after

the officers have retired for the night, and at the latest hour he will find the haunts of vice open. In the English colleges, which are built in the form of a quadrangle, with only one entrance, the door can be locked at an appointed hour, and all egress denied; but our colleges have no such convenience: they are open at all hours of the night. What careful parent, residing in a large town, would allow his son, at sixteen years of age, the means of leaving and returning home at all hours of the night? yet he will send him to college at a critical age where such liberties cannot be prevented; and will, perhaps, blame, the institution if his son is ruined.

Another evil in college, is the unrestrained intercourse of the students at an age when the passions are strong, and the judgment and will weak and wavering. Young men of corrupt principles cannot be altogether kept out of college. In a large collection of students, use what precautions you will, the leaven of vice will always exist: and when the passions are addressed, the young mind is quite as susceptible of bad impressions as of good. By little and little, the moral principles may be undermined by this daily mingling with the vicious; and the youth, whose guileless heart knew no evil when he left home, is soon prepared to rush to the commision of any vice, whenever an opportunity offers. We know of no college in which there are not secret societies, established under pretence of literary improvement or friendship, but known to be nurseries of vice, in which the obligations of morality and religion are set at nought, and resistance to the government of the college encouraged; and meetings held at late hours, for the purpose of unrestrained dissipation. Into these societies many young men are inveigled, almost as soon as they enter college, pledged to secrecy, and made to feel themselves bound in honor to maintain them, by every means in their power. All attempts to suppress these societies have hitherto proved abortive; for their very existence is sometimes one of the secrets, which the members are bound not to divulge to the college authorities.

Indeed, such is the difficulty of controlling the habits and morals of the students by preventive discipline, that, in many of the larger colleges, it has been mostly abandoned. The rooms of the students are not regularly visited, no especial care is taken to keep them in at seasonable hours, and very little is done in the way of private admonition and advice. The government is wholly penal. A standard of attainments is fixed, and all who fall below it, whether from incapacity or indolence, are summarily dismissed. A standard of morals is also fixed, and any one detected in a gross offence is expelled or dismissed; but owing to the difficulty of detection, much immorality is practised with impunity.

Such a system may be best for the reputation of the college, but it

is cruel towards the young men who resort to it for education; and yet as our colleges are organized, it is almost unavoidable. To form an idea of the loss of young men from the failure of college discipline to effect what is expected of it; but as regards scholarship and morals, we have only to look at the successive catalogues of the college, and note the number of students who leave without having completed their course of studies. Take the case of Yale College, which enjoys a high reputation, both for scholarship and discipline. As appears from the catalogues, all the admissions to the class graduated in 1841, amounted to one hundred and thirty-seven. Of these only seventy-eight remained at the beginning of the senior year, showing a loss of fifty-nine, or nearly three-eighths of the whole. Of one hundred and twenty-seven, entering the freshman class in 1839, seventy-three only are found in the senior class three years afterwards. The small colleges, probably, do not exhibit a proportionate loss; for in these, there are better opportunities for the exercise of the personal influence of the faculty; and the necessities of these institutions may induce them to retain students who would be dismissed from the larger colleges. It will be readily admitted that all who leave college without completing their course, are not dismissed for deficient scholarship or iommral conduct. [We might perhaps, set down one-fourth of the number to ill-health, pecuniary embarrassment, or other circumstances, which render a change of pursuits expedient; but after making this allowance, the proportion [is by far too great; and shows conclusively that the discipline fails of its most desirable effect, the *prevention*, rather than the punishment, of indolence and vice.

I shall mention only one other particular in which our college, are deficient; and that is, in preserving and promoting the health of the students. When a young man has reached the age of eighteen or twenty, the care of his health may be left with himself, guided by such suggestions as may be thrown out in a public lecture, or in occasional conversation. But a lad of fifteen needs something more than suggestions and advice. At no period of life does the health require such unremitting care, and at no other period are there equal carelessness and recklessness. At that age personal cleanliness, strict temperance, and regular exercise, are indispensible, both for present comfort, and for forming a strong and vigorous constitution. The neglect of these, particularly at a time when the stature is rapidly increasing, brings on a languor, both of body and mind, and predisposes to secret vices, destructive to the health and morals. It is this languor which makes all kinds of stimulants welcome as a relief; and the general use of tobacco in our colleges, which shatters the nerves and ruins the health of so many, owes its prevalence, in a good degree, to this cause.

Some colleges have provided means for gymnastic exercises; but these exercises being no part of the system of discipline, are neglected by those who need them most. We know of none where conveniences are provided for bathing, much less any measures adopted to secure attention to this very essential requisite of health. Shall we wonder, then, that the health of young men so often suffers in college? We often hear of students who have ruined their health by too close an application to study; but, for every one injured by hard study there are at least ten injured for want of exercise, and the neglect of personal cleanliness.

Taking, then, into account the defects of college discipline, in the all important matters of scholarship, morals, and health, it is by no means surprising that the result should be so unsatisfactory, or that thinking men should be desirous of some kind of reform. That there has been a growing distrust of these institutions, would appear from the fact, that while the means of education have rapidly advanced, the increase of students in the several colleges, has not kept pace with the increase of our population.

But the question may be asked, Are the colleges less adapted to their peculiar work than they were in the last generation? To this we answer, That while the general features of the colleges have not changed, the circumstance of the community have changed. In the last generation, boys did not begin the study of the classics so early. Good classical schools were few in number, and it was not thought advisable to send young lads from home to prepare for college, till they were capable, in some degree, of taking care of themselves. There were not then, as now, boarding-schools all over the country, promising to take boys at any age, and act the parent for them better than it could be done at home. The consequence was, that a majority of the students entered college later in life, after their habits were in some degree formed; and they had the discernment to see the use of systematic application, and appreciate the advantages of a liberal education; and on that account had less need of college discipline. Our colleges are proper places for young men, fit to be entrusted with the responsibility of their own conduct; they are utterly unsuited to boys who need the discipline of the school-room, and the watchful care of masters and monitors.

Another circumstance has contributed to render our colleges unfit places for the younger class of students. When they were founded they were located in villages, where the temptations to vice and idleness were few; and where it was extremely difficult for the student to take the first step in wickedness without the knowledge of the faculty. These villages have now grown into large towns, which afford not only

temptations to every kind of iniquity, but also facilities for concealment. The moral principles of a boy may be perverted, and the seeds of ruin sown, ere the instructor is aware of it. It is true, that young men designed for public life, must pass through the ordeal of temptation; but let not this take place, till increased knowledge and maturer judgment will enable them to pass through it in safety.

From this view of the failure of our colleges to effect what is expected of them, an important question arises, What can be done to improve them? Shall all the students be compelled to prepare their lessons in a common room, as in the grammar schools? Shall they be constantly kept under the watch and ward of tutors and proprietors, to prevent them from being corrupted by unrestrained intercourse with each other? Shall the buildings be surrounded with high walls, with iron gates and massive locks, to prevent egress during the night? And shall gymnasia and baths be constructed, and persons be employed to enforce daily exercise, and see that the proper ablutions be performed, and due care taken of their health? Any system of this kind would be attended with great expense, and even then would fail of the desired effect. Boarding schools which have professed to do all this, have failed to secure a close attention to study, or preserve unimpaired the morals and health of their inmates.

No alterations in the organization or discipline of our colleges could remedy the evils complained of, so long as young lads of fourteen or fifteen years of age, are sent to them to receive their education. Fix the age of admission at seventeen or eighteen, and other reforms would not be so much needed. It might be well to alter, in some respects, the requisites for a degree, making it depend more upon the amount of knowledge acquired, as ascertained by a searching examination, and less upon the time spent within the college walls. There can be no good reason why the student, who can fully sustain his examination for a degree, should remain in college while his duller classmate is prepared to receive the same honor. Nor is there any good reason why the indolent or stupid youth, who has lived out his four years in college without being much the wiser for it, should receive his degree at the close of that period, or indeed at all, if he cannot sustain a thorough examination. A diploma ought to be an evidence of scholarship; but so worthless has it grown, that the private recommendation of the president, or of a professor, is of more value than the parchment certificate of literary qualifications, given under the seal of the authorities of the college, and delivered with so much solemnity on commencement day. The graduate of West Point is known to be a proficient in the studies pursued at that institution; but we would laugh at the simpli-

city of the man, who would infer, that the graduate of one of our colleges was necessarily a scholar.

The expense of erecting so many college buildings might be dispensed with, if students were not admitted so young. It is better that they should lodge at their boarding-houses, and prepare their lessons there also. If there were a smaller number in the same building, there would be less interruption from unseasonable visitors, and less noise and disorder.

Much has been said of the inexpediency of collecting so many students together as are found in the larger colleges. But if students were not sent to college till their characters were in some degree formed, the number of students in one institution would be no evil, but rather a great advantage. The stimulus to exertion is much more keenly felt where the number of competitors is large. They are brought in contact with minds of every grade, and in the strife for honor, powers are often developed which had otherwise remained dormant. In proof of this, it may be observed that, while in a small college, well managed, there is perhaps a less proportion of very inferior scholars, there are none who reach so high a degree of attainment, or exhibit powers so well developed, as when higher honors, arrived at by a sharper competition, await the successful aspirant. A large institution of learning also gives its members an opportunity of forming an extensive acquaintance and numerous friendships—a great advantage to young men designed for public life. Nor must we pass over the benefit resulting from bringing together so many individuals of different creeds. Men learn forbearance and charity by being in constant intercourse with others whose religious opinions differ from their own. Extremes of opinion are corrected, and unkind feelings suppressed. That religious body which fears to trust its young men, after the ordinary course of religious instruction is completed, among those of different creeds, must either have little faith in the power of truth, or some misgivings whether its own creed is founded in truth. There is a period in life when the careful parent would wish his son to be under the influence of those whose religious belief was the same as his own; but the time will come when the son must think and act for himself, and this will be quite as soon as he is fitted to withstand the temptations of college life.

But what is to be done with the tyro who has completed his preparation at the grammar school, or at the academy, and is yet too young to be trusted at college? Most lads who have had the advantage of good instruction, are prepared for college at fifteen; how are they to spend the next three years? The answer is easy. We have only to extend the sphere of the preparatory schools; we have only to put the

college tutors into the grammar schools to exercise their vocation there, and the difficulty is at once removed. The two lower classes in all our colleges are mostly taught by tutors. It requires no great attainments —no extraordinary ability, to instruct in grammar and pure mathematics; and little else is taught in the lower classes in college. Accuracy and thoroughness is all that is required. A cursory examination of the course of studies, published in the catalogues of the several colleges, will show that there is nothing in the studies of the first two years which could not be taught as well in an ordinary academy. It requires no great collections of books, and philosophical apparatus, and minerals, and geological specimens, to aid either pupil or teacher, in algebra, geometry, grammar, and the easy Latin and Greek authors read in the two first years of the college course. If a lad is prepared for the freshman class at fifteen, he can be prepared for the junior class at seventeen; or what would be better, he could spend one or two years in the study of the modern languages, or in healthful, invigorating exercise, and enter that class at eighteen or nineteen, and have three chances to one of graduating—a better scholar at twenty-one, than if he had spent the whole time in college.

If it be thought that the preparatory schools are not in a condition to carry students so far forward in their studies, we have only to say, that if the demand for a higher grade of instruction in these schools is made to exist, the supply will not long be wanting. Let the same price be paid for tuition which is charged in the colleges, and able teachers will soon be found to take charge of them.

These schools, situated mostly in small villages, with a limited number of scholars, and subjected to a rigid discipline, will be free from most of the objections urged against colleges. Idleness can be prevented by the discipline of the school-room, or any vicious or improper conduct can be speedily discovered and properly punished. The students, distributed among the families in the vicinity, and kept under the restraints of domestic life, have neither the opportunity nor the temptation to operate together for improper purposes. Two well qualified instructors could take care of from forty to fifty boys in such a school, and could afford to labor for a compensation much smaller than in a larger town, where the expenses of living are greater.

In the large towns, where such schools can be supported by the local patronage, the parent has the additional advantage of having his son at home at the same time. The expense is much diminished by this circumstance, and he can superintend the moral education of his son, and urge him on in his studies by motives which filial affection will render doubly powerful.—The diminished expense might also induce

parents to allow more time for the completion of the education of their sons, and thus raise the standard of scholarship in the colleges themselves.

Were we to draw out a plan for the education of a boy, designed for one of the learned professions, it would be something like the following:—Let his education be begun in the common public school, where he would meet with all classes of boys and all descriptions of character. To guard his moral feelings from contamination, let him be allowed and encouraged to relate at home whatever he sees and hears among his play-fellows, and let his parents approve or disapprove as the case may require. Let him thus early become acquainted with the distinction between right and wrong, good and evil, and taught to cherish the one and avoid the other. He will thus acquire a hardihood of character, a power over his own desires, and a strength of purpose and of will far superior to the boy who has been kept out of harm's way, and furnished with a private tutor to make the path of learning smooth and pleasant. The stern discipline of a large school, composed of boys of every shade of character, is useful to break the will to rightful authority, and cultivate patience and fortitude under evils which must be borne for the sake of after benefit. He who fears to trust his son among the poor boys of the common school, and therefore sends him to a select school, patronized only by the rich, should remember that the rich have their peculiar views as well as the poor, and that the effeminacy and peevishness of the spoiled children of fortune are quite as contagious, and more disastrous in their effects upon the character, than the rude manners, and harsh, blunt passions of the sons of poverty.

At the age of twelve or thirteen, we may suppose the lad to have completed the studies of the common school, and to be ready to enter upon a higher course of instruction. If, then, he can enter a higher school without leaving the paternal roof, let him begin the study of the ancient languages.—But let it not be a school where the teacher stands constantly at his elbow, to remove every difficulty in his way, and think for him as well as instruct him. Let the powers of his mind be taxed as much as they can bear without discouragement; and let him not only be encouraged, but compelled to think for himself. Large schools have this one advantage over small ones—the teacher has not the time to aid the scholars in their lessons, and they are under the necessity of depending upon themselves.

When the boy arrives at that period of life when the stature is rapidly increasing, let him not be kept too constantly at his books. If, then, he can spend a year or two in some employment which requires considerable physical effort, he will be benefitted thereby. When energies

of the system are being expanded upon the increase of the bodily frame, the brain should not be too severely taxed. Then let the muscles, and all the organs of the rapidly increasing body, be strengthened and invigorated by cheerful exercise in the open air.

Should there be no school of the right description in the vicinity, let not the parent, in his taste to finish the education of his son, be induced to send him away from home before he has arrived at an age when he can be relied on to take care of himself, under the advice and direction of judicious friends: and when he arrives at that age, which is seldom under fourteen or fifteen, let him be sent to some quiet village academy —not to be placed at board with the principal, among a horde of other boys, but in some well-ordered family, where the domestic influence may still be felt, and his responsibility to the domestic circle continue to be insisted upon. The quiet influence of evenings spent at the fireside of a virtuous family, is far more effective than all the restraints and guards resorted to in the best regulated boarding-schools.

A youth of good talents thus educated, might, at the age of 18 or 19, be a proficient in the grammars of the ancient languages—be able to construe any plain author with facility, and write Latin with tolerable correctness. He might also have mastered the usual course of pure mathematics —made some progress in the modern languages, and stored his memory with the leading events of history. Then entering college, and placing himself under the guidance of accomplished instructors, he would be able to appreciate the higher beauties of the classics—to enter to advantage upon the study of natural philosophy and metaphysics, and profit by the lectures and more practical studies of the last two years of the college course.—*Democratic Review.*

Thoughts on the State of Education in the Southern States.

To the Editor:

Dear Sir,—The establishment of a Journal devoted to Education, national in its aim, confined to no particular locality, limited to no special sphere, affords to the friends of education everywhere, a most favorable opportunity to express their views, and secure an interchange of sentiment, which must tend to promote the interests of a cause which knows no limit, recognizes no boundary, but the happiness and welfare of the whole human family. It is a fact, no less lamentable than remarkable, that in no state south of Mason

and Dixon's line, is there a well-regulated or complete school system. In Delaware, if I mistake not, the whole machinery of her public school system is made to depend upon the popular will, and the result is, that where the teacher is most needed, he is most sure to be voted out. If I am wrong in this matter, it will be very easy to correct the error.

One of the first movements ever made in the United States, in support of public education, was made in Maryland: yet how is it with her now?

In 1825, the Legislature of that State substituted for her odious and useless charity school system, a general Primary School Law, which remained a dead letter on her statute book for nearly ten years. At length the people were aroused to the importance and necessity of something better than the mere "brutum fulmen" of an inert law, and the subject was submitted to the ordeal of the ballot box. A more fatal error could not have been committed, for thousands were called to vote upon the question, who uneducated themselves, and unimpressed with the advantages placed within their reach, influenced by party feeling, and swayed by the representations of the penny-wise and pound-foolish property holders, especially old bachelors and antique spinsters, in some counties rejected the system, while in others it was adopted, but in all had so much instability infused into it, as to render it comparatively valueless.

In scarcely a single county is the system of 1825 now in operation; in one (Caroline) fourteen changes have been made in it since its adoption; and in all so variable, contradictory and inconsistent has been the course of legislation, that Judge Dorsey has declared, in his Laws of Maryland, his inability to reduce the incoherent mass to anything like order or regularity. In some counties each election district has its own peculiar system, and so apparent was this want of system in the different school districts of the state, that at the session of the legislature in 1842, John Pickett, Esq., then a member from Allegany, and always the ardent friend of popular education, submitted a proposition to remedy the existing disorder. A committee, consisting of Hon. J. C. Legrand, then secretary of state, the state treasurer, and

librarian, were appointed to prepare a "Plan of Public Schools for the State."

At the request of that committee, another plan was drawn up by a committee of the "Maryland Institute of Education," of which S. F. Streeter, of Baltimore, was chairman, and the two plans were presented to the subsequent legislature. A third plan, prepared by a teacher from the Eastern Shore, was offered at the same time. The whole matter was referred to the Committee on Education, a Committee of Sadducees, with whom there is no resurrection, and has not since been heard of. In the meantime, matters are constantly growing worse, ignorance is increasing, prejudice is gaining strength, education is more neglected, and the Committee on Education have been all the while groping in the dark for materials to make a report on the condition of education, and have only been able to say what the treasury books show, that from seventy to ninety thousand dollars are annually drawn from the exhausted treasury for school purposes.

I have briefly stated these facts in the history of the school operations of Maryland, in the hope of inducing some of her influential citizens to attempt the removal of the chaotic mass of absurd and crude legislation under which she labors, and to serve as a warning to those states which have yet introduced no system at all.

Upon a subject so fraught with importance, so essential to the virtue of the people, so deeply and directly affecting the stability of the government, the rude hand of the demagogue should never be laid; the foul breath of party strife should not be breathed upon it;—the interests of politicians never be permitted to mingle with it.

It may appear anti-democratic, but when legislators undertake *to punish* crime, they can be independent; prisons and penitentiaries can be built, gallows can be erected, and penal laws enacted without the consent of the people; but when it comes to a system of general education *to prevent* crime, then the dear people must be consulted. Well would it be if legislators would learn that it is not by prisons and gibbets, pains and penalties and sanguinary enactments, that the American people must be

governed, but rather by the influence of cultivated mind, and the power and example of uncorrupt morals.

In Virginia, the education fever prevails periodically, as a sort of septennial epidemic; the subjects of it assemble together, and make long reports and longer speeches, which operating as a kind of grandiloquent depletion, the symptoms subside, and the patients recover. Less can be said of states farther South, for being in a state of atrophy, they show no symptoms whatever.

If I write these bitter things of the South, it is because I love her sunny skies, her green hills, her ever-dancing, flashing waters, her noble, generous-hearted sons, and more than all, her beautiful and sylph-like daughters. It is my home: the hallowed associations of childhood, the delightful reminiscences of youth, the most pleasing social intercourse of riper years, bind my very heart to her soil; in her dilapidated temples have I worshipped; in her neglected, but no less sacred sepulchres, are the ashes of the dearly loved and highly honored—parents—brethren—friends; life, and all its varied relations, its pleasures and pains, its vicissitudes and changes, attach me to her people; and well may I adopt the beautiful sentiment of the fair Hebrew, "thy people shall be my people."

"Many shall run to and fro," saith the prophet, "and knowledge shall be increased," and while this prediction is receiving its full and literal accomplishment North, East and West, why is it not so in the South?

It is not for want of means, for if the reports annually made to the various legislatures show any thing, it is that money has been lavished upon education.

Nor would it be just to attribute this depression to any inability to appreciate the advantages of a general diffusion of knowledge; that there is an apathy, however, must be admitted.

Some few Southern newspapers, in noting and commenting upon the change of population in the South, and particularly in Virginia, have vaguely hinted at a cause, which has left more to be inferred than could well be expressed in words.

I believe that truth needs no concealment, that it is best that the whole truth be plainly stated, distinctly understood, and can-

didly considered. Now the truth in this case is, that by far the larger portion of the Southern States is deficient in the very first requisite of a prosperous and efficient school system—a people to be educated. In many parts of Maryland, ten regular pupils cannot be gathered into a school, in the centre of an area of five miles square. In parts of Virginia, the census shows an average of one child and a half to three miles square (of course exclusive of towns), and this sparseness of population of the kind which it is deemed safe and desirable to educate, is the true cause of the backwardness of education; farther South, the plantations become larger and the proportion greater.

Can no remedy be applied to this?

The drain upon the Southern population is still kept up, and the same causes which produce this result, prevent immigration.

The hardy adventurer from the North passes down the Ohio River—the land of Washington, the mother of statesmen, is, on one hand, attracting him by her genial clime, her bounteous soil, her unsurpassed advantages of forest and mineral wealth and water power, her bright and glorious memorials of the past; on the other hand is Ohio, with less of all these, and nothing of which she can more proudly boast than her youth and teeming population, and her vigorous school system. But the price of land is probably tenfold in Ohio: is that a sufficient inducement for him to choose Virginia as his home? No. He sees no school-house; upon her statute book is no law securing to his children the priceless treasures of the mind; he learns that in her most favored counties, as old Berkeley and Jefferson, Loudon and Faquier, more ignorance can be found than in the whole state he has left; that in the first-mentioned county, which judges have complimented for the superior intelligence of her juries and witnesses, more adults, unable to read and write, can be found than in the whole state of Connecticut can muster. He reflects that ignorance is the prolific mother of crime, that an empty school-house makes a full prison, that true happiness is not known without refinement of intellect,—and that if his children be reared in ignorance, the same may be ex-

pected of future generations, and that the difficulties of securing a system of education increase in a compound ratio by delay, and that the insecurity of life, property, and character, are inversely increased as intelligence and morality decrease, and he turns from a goodly land, and greater natural advantages, and seeks a home where there is a school-house. What, then, should Virginia do? Can "masterly inactivity" profit her? She has tried it long enough; let her now adopt a different policy; let her at least strive to fix her own population, and induce the influx of others, by placing upon her code a law providing for the intellectual wants of her people; no matter if it be a mere skeleton, no matter if it be as yet inoperative, and only prospective; for a large portion of the state it would be so, the system would have to wait for a population, but it would at the same time be drawing one. The incipient step would be a guarantee of good intentions, and the immigrant would see in *that*, the nucleus around which could be gathered the prosperity and true glory of his future home, and the safety and permanent happiness of his offspring. The first want of the Southern States, then it will be seen, is a school system, and more or less dependent on this, is the first requisite of its practical operation, a population to be educated. The details of such a system as would best accord with the peculiarities of the country, climate and people, may possibly be suggested hereafter; my present object is to draw the attention to the causes which tend to depress the interests of education, the first of which is the sparseness of population, and the absence of any manifestation of a desire or intention to overcome this obstacle by giving to the people a law establishing common schools, or holding out any inducement to settlers to remain in her territory. Other causes will be given hereafter.

VIRGINIUS.

Distribution of the School Money.

Apportionment of the annual distribution of $275,000, proceeds of the School Fund, among the several Counties of the State of New York, according to the census of 1847.

	Population.	*Apportionment.*	*Average months.*
Albany	77,268	8,155 00	9
Allegany	31,611	3,336 57	7
Broome	25,808	2,724 15	7
Cattaraugus	30,169	3,185 27	6
Cayuga	49,663	5,241 94	8
Chetauque	46,548	4,913 42	7
Chemung	23,689	2,500 48	7
Chenango	39,900	4,211 65	7
Clinton	31,278	3,301 54	6
Columbia	41,976	4,430 76	9
Cortland	25,081	2,947 50	7
Delaware	36,990	3,904 48	7
Dutchess	55,124	5,818 50	9
Erie	78,635	8,300 00	8
Essex	25,102	2,649 65	6
Franklin	18,692	1,973 02	7
Fulton	18,579	1,961 10	9
Genessee	28,845	3,044 45	9
Greene	31,957	3,373 18	8
Herkimer	37,424	3,950 58	8
Hamilton	1,882	198 58	5
Jefferson	64,999	6,860 96	7
Kings	78,683	8,304 18	12
Lewis	20,218	2,134 35	7
Livingston	37,345	3,941 97	9
Madison	40,987	4,325 59	8
Monroe	70,899	7,483 46	9
Montgomery	29,643	3,129 00	9
New York	371,223	39,183 58	11
Niagara	34,550	3,646 91	8
Oneida	84,776	8,948 98	8
Onondaga	70,175	7,406 94	8
Ontario	42,992	4,495 80	8
Orange	52,227	5,513 10	9
Orleans	25,845	2,728 06	8
Oswego	48,441	5,113 68	8
Otsego	50,509	5,331 21	8
Putnam	13,258	1,399 44	9

	Population.	*Apportionment.*	*Average months.*
Queens	31,849	3,361 89	10
Rensselaer	62,338	6,581 89	9
Richmond	13,673	1,443 25	10
Rockland	13,741	1,450 52	9
Saratoga	41,477	4,378 13	8
Schenectady	16,630	1,755 36	8
Schoharie	32,488	3,429 26	9
Seneca	24,972	2,636 11	9
St. Lawrence	62,354	6,581 76	7
Steuben	51,679	5,455 03	8
Suffolk	34,579	3,650 32	9
Sullivan	18,727	1,976 95	8
Tioga	22,456	2,370 42	8
Tompkins	38,168	4,029 21	8
Ulster	48,907	5,162 37	9
Warren	14,908	1,273 88	6
Washington	40,554	4,281 23	8
Wayne	42,515	4,489 00	8
Westchester	47,578	5,023 04	9
Wyoming	31,526	3,328 19	8
Yates	20,777	2,193 17	7
To Indians		80	
		$275,000	

Annual Reports.

We have received the Annual Report of N. S. Benton, Secretary of State, and Superintendent of Schools for the State of New York.

We have also been politely furnished, with the annual report of Seth P. Beers, Superintendent of Common Schools, for the State of Connecticut.

We propose, probably in our next, to make some tabular statements of the various statistics of those states, in which there are regular school organizations, under the patronage and supervision of the state authorities. So far as regards the school fund of the states above-named, they furnish us specimens of munificent endowments.

The productive capital of the Common School Fund, in New York, is	$2,133,943
Unproductive,	163,800
The United States Deposit Fund, now producing an income of 165,000 annually,	2,750,000
Making a fund of	$5,047,743
Amount invested in Real Estate, School Houses, and other improvements,	3,807 123
Aggregate investments for Common Schools in the State of New York,	$8,854,866
The amount distributed annually, as avails of this Fund, is	275,000
Whole number of children in the Common Schools, is	742,433
Capital of the School Fund in Connecticut, is	$2,070,055
Annual dividend,	$119,384
Connecticut has the largest School Fund in proportion to its population, of any State in the Union. With an average attendance in the winter schools, of	52,800
And in the summer schools, of	41,572
While the whole number in the State, of the school age, (between 4 and 16)	71,196

Notices of Books.

Female Authors.—It is one of the interesting signs of the times, that educated ladies, who have so long kept themselves in the back ground, are occasionally stepping forward as authors and becoming allies—no, rivals of the sterner sex in the production of books. Formerly in the highly cultivated upper circles of European society, some lady of towering genius or cultivated taste, would, now and then, send forth from the press a thrilling tale of imagination, like Miss Porter, or a politico-historical speculation, like Madame De Stael; or, perhaps, ascending to high analysis in

mathematical and physical science, like Mrs. Somerville; but these writings and speculations, although they powerfully vindicated the sex from the charge of mental inferiority, were rather luxuries for the intellectualism of one in a thousand, than of any use to the multitude.

Among the numerous changes which the progress of society exhibits, tending, as croakers tell us, to extravagance and effeminacy, it is certainly a cheering sign to see educated ladies entering the lists in the production of literary works of a utilitarian character, like Miss Elizabeth Oram, in making books designed for the millions.

J. C. Riker, 129 Fulton-Street, has published a book entitled the Pictorial Definer, by E. Oram, in which the principal representable words of the language are illustrated by engravings, and defined in words, in an ingenious and successful manner, representing to the eye, many subjects of natural history, of mechanism and of the arts, so that a child may comprehend them.

First Lessons in English Grammar and Composition, with Exercises, by Elizabeth Oram: Paine and Burgess, 60 John-Street.—This book is a little out of the usual style of school books; spelling, reading, and grammar, being carried on collaterally. This book exhibits the versatility of talent and originality, for which the author is remarkable. This lady has, as a practical teacher, done excellent service to the cause of education, and presents strong claims upon the *public patronage.*

The Merchants' Magazine, by Freman Hunt, Editor and Proprietor.—This incomparable Magazine, commends itself to the favorable regard of every well-educated mercantile man. We like those periodicals which fix upon a worthy object, and then pursue it with steadiness and energy.

The Democratic Review.—This has become a standard work. Its columns show that several able writers are among its con-

tributors. Although from our position, we shall eschew politics, yet we shall be happy to appropriate for the benefit of the cause we have espoused, such articles as the one on Collegiate Education.

Theory and Practice of Teaching, by D. P. Page, A. M., Principal of the State Normal School, Albany. Hall & Dickson, Syracuse, and S. Barnes & Co., New-York, 1847.—This is a beautiful volume of about 350 pages. It is creditable alike to the stereotyper, the printer, the publishers, and the author. The demand for such books betokens progress in the profession. Few have written with more delicacy and taste, and few have shown greater practical acquaintance with the details of instruction and government, than are evinced in these essays of the accomplished teacher of the State Normal School.

American History. By Marcius Willson, author of School History of the United States, Comprehensive Chart of the United States, &c. Published by Mark H. Newman & Co., 199 *Broadway,* 1847.

There is perhaps no historical writer in our country, whose facts and dates have been collated with so much care, and verified with so much fidelity and labor, as those of Mr. Willson. This publication embraces historical sketches of the American Indians —American Antiquities—History of the United States—British Provinces, Mexico, &c.

We know of no other volume of American History, which is so accurate, and at the same time so full. The aboriginal and colonial annals, or chronologically arranged data, are of great value, and quite complete. The emblematic devices, state escutcheons, armorial bearings and seals of the different states, are given and explained in a full and more satisfactory manner, than we have seen in any other book of American History. This work presents an impartial narrative in one volume, of the events which have transpired worthy of record, from the discovery of this country by Columbus, to 1846. The book is got out in a style, that reflects credit on the publishers.

Scripture School Reader: Nafis & Cornish, 278 Pearl Street. Compiled and arranged by W. Everts, A. M., and W. H. Wyckoff, A. M.—We have before seen compilations from that incomparable book, such as the Scripture Lessons, and Sampson's Beauties of the Bible, &c., that were made with taste, which commended them to the scholar and the Christian; but the *Scripture School Reader* is compiled not only with taste, but with judgment and skill. It is arranged under three distinct heads—Didactic, Historical and Biographical, and Poetical. The first of these consists of the most admired passages of a didactic character, from almost every part of the sacred volume.

The second part consists of those interesting narratives and sketches of character with which the Bible abounds. The third part has in it, grouped together, more poetic imagery, more loftiness and more sweetness of conception, more sublimity and more beauty, than can be found in any uninspired book. It seems that the text is given in its purity. It is without comment, and, we think, ought to escape any suspicion of an attempt at proselyting. If selections of scripture are to be used in the schools of our city and country, we have seen none so appropriate, and in every respect so suitable as these.

A Grammar of the English Language, by W. H. Wells, M.A. Published by Allen, Morrill & Wardwell, Andover; and Mark H. Newman, New-York.—The author of this grammar evinces scholarship, and an intimate acquaintance with the subject under consideration. Mr. W. has had the good sense to respect the usage of the best writers--has noted with discrimination the idioms and anomalies of the language, and instead of deciding by his own dictum, he has weighed and compared authorities, and his preference is usually with the preponderance of testimony. We consider this one of the best grammars of the language that has appeared.

T. Clowes, LL.D., having found it inconvenient to furnish the article promised on the powers and properties of numbers, we can only say that such article *may* probably appear in a future number.

Free Education.

The tendency of mankind to run into extremes is so manifest, that the remark has become trite; yet one generation is very slow in profiting by the errors of another, and we find that, amid the accumulated experience of sixty centuries, not only individuals, but whole communities are still ready to vibrate through every degree of the circle of opinion, which generally determines action. This observation applies with particular force to the views entertained regarding the duties of a community in their political capacity. At no very distant period, the community, or at least its political organ the legislature, attempted to control individual action to a degree that was not only vexatious, but frequently absurd. Now, because this was a great evil, our politicians must adopt the opinion that the community should let individuals alone, and that "*the best government is that which governs least.*" Were this true, it would follow, as clearly as any mathematical corollary, that the best state of society is that in which there is no government whatever, an opinion which has actually been adopted by some who consider themselves moral luminaries, but which can never find favor with any one who sees man as he is.

Again, the union of church and state is a great evil: it offers a premium for hypocrisy; it prejudices men against truth, if the state religion be conformable thereto, and it robs the whole community to propagate error, if the state religion be false. Some, therefore, conclude that the community should not interfere with education, since they *fancy* that it *appears* like a union of church and state.

Now, in opposition to all such views, we maintain that it is the duty of the community to control individual action, whenever such a course will contribute to the public welfare, and that consequently *it ought to provide means for liberally educating every one of its members, free of expense, whenever this is possible.* Where the want of adequate means renders this impracticable, it ought to go as far towards such a consummation as circumstances will allow.

Political communities, so far as they are voluntary, are originally founded, and afterwards maintained, solely for the benefit of their individual members. Men willingly submit to the restrictions of law, and the exactions of the tax-gatherer, as long as they believe that these contribute to their welfare, and no longer. Every one appears to be satisfied that his individual welfare often requires him to unite with others for common defence, or for the attainment of some common good, which could not be so effectually compassed by detached efforts; and, in consideration of the great benefits accruing from such unions, he cheerfully submits to such impartial regulations as may be necessary to their existence. We submit to the restraints and expenses of political institutions only on the condition of their aiding us to the utmost of their power: there is no stipulation that they shall not confer on us some particular kinds of benefits. Such a stipulation would be manifestly absurd. Hence we see that it is the duty of the body politic to do all in its power for the public welfare, since this is the sole end of its institution, and the only reason why it is upheld.

Some would limit the political sphere of the community to securing person, property and reputation, but such a limitation can be defended only upon the supposition, that private efforts can better effect all other objects, a supposition which has never been proved to be true, and could easily be shown to be false. How many public works of great utility have been finished by means of legislative action, which otherwise would never have been commenced. The reason why the body politic should not interfere with some subjects, must be, simply that such interference would produce more evil than good. If a union of church and state contributed to the spread of true religion, then we should, by all means, effect such a union: we ought to oppose it, simply because it would produce much evil, and no good which cannot be effected otherwise. We presume none of our readers will deny that the body politic should act when they could effect some good unattainable by any other means, and without producing any counterbalancing evil. To prove our assertion, therefore, all we require to show, is, that such a course would produce a degree of

public prosperity which will never be realized by any other means, and that *no* evil results would follow.

Before proceeding further, we shall state what we consider a liberal education. By this expression, we understand *all those branches which are of practical value to every one.* We consider that, besides the common branches, these are the elements of the mathematical, physical, mental and moral sciences. A *liberal* education is contradistinguished, according to our view, from a *professional* or *technical,* and not merely from an *elementary* education. As the advantages of the second kind of instruction are apparent to all, and the expense of that required by the masses is quite trifling, it may be safely left, for the most part, to individual action. Yet even here, the public at large are certainly benefitted by the services of able professional men and mechanics, and therefore, if necessary, they should supply the means for procuring such an education at a moderate expense. Under the term professional men, we do not include the clergy; for we believe that state interference with religion is, in every case, either impolitic or unjust to individuals.

To professional education we refer all languages, and such branches as navigation and surveying, further than a knowledge of the mere mathematical principles on which their rules are based. A slight knowledge of the foreign roots of English words, is necessary to a good understanding of our vernacular; but this cannot be reckoned anything more than part of a good English education.

Languages are of no importance whatever, except as a means of receiving and imparting ideas; for all the faculties can be better developed by other means, and the masses of the community employ only their native language in communicating their thoughts, a language which contains more treasures of knowledge than they can ever master. A knowledge of several languages is indispensable to a literary man; and, as matters now stand, they are very useful at least to professional men; but the facts just stated show that, to a common citizen, they cannot be of much use.

Some estimate of the advantages that would accrue from a

liberal education, may be formed from glancing at the beneficial results of a slender modicum of public education, wherever this has been supplied. In what country are crimes most rare? In that which possesses the most efficient system of public education. Compare Prussia with Austria;—the former is decidedly superior in the morality, as well as in the intelligence of its population. But this superiority does not run back farther than the last century, and hence there can be no doubt about the cause. A comparison between England and Scotland gives a still more favorable view of the power of education. The Scottish character is naturally more sanguinary, and not more honest than the English; and hence we find that while the state of education was the same in both countries, crimes were proportionately more prevalent in Scotland. *Now*, the case is reversed; England gives a much greater proportion of crimes in every branch; and this, although the Scots are poorer, and therefore under greater temptations to commit offences against property. A comparison between the different sections of our own country, leads to the same conclusion.

Again, if we examine the educational attainments of our criminals, we shall find that a very large proportion of them are either quite illiterate, or so imperfectly educated, that their attainments practically amount to nothing, while the proportion of such persons in the community at large, is very small; so that if we compare the proportion of criminals in each class, that supplied by the uneducated, becomes so enormous as to constitute the rule. It is true that well-educated persons are *sometimes* guilty of flagrant crimes; but the surprise which such a case excites, proves that such an occurrence is rare. It will also be found that, in every such case, there was one or two unfavorable circumstances operating against the criminal. Sometimes the education has been *one-sided:* the individual was well instructed in certain branches, but these were not the most important. More frequently, perhaps, the labors of the teacher have been counteracted by the conduct of parents or guardians. We believe a single instance cannot be produced of a well-educated criminal who has labored under neither of these disadvantages. If parents are incessantly

instilling selfish principles, and expressing a uniform contempt for the rigid rules of morality, no wonder that *their* teaching should completely nullify that of the public instructor.

We shall now glance at the defects of the present system, and the advantages that would result from a more extensive course.

1st. *The present system does not instil a taste for intellectual enjoyments.* The beauties unfolded by science continue unknown to the pupil. His labors amid the dull routine of learning to read, and the abstractions of grammar, are particularly dry and repulsive. The case is rendered still worse by the inability of most instructors to render these subjects interesting. If the teacher's reading and knowledge of the subject were extensive, he could both illustrate them, and render them more attractive, than by merely drilling his pupils "on the book."

2d. *The present system does not convey enough of practical information.* The pupil spends a good deal of time in learning the localities of insignificant objects on the other side of the world, while his attention is never called to the structure of his own mind or body, and he is left to learn the laws of thought and the laws of health, just as he pleases. He is taught nothing of the conditions of health, or of the nature of those substances that surround him, and continually affect him, for good or for evil. He is never directed to the foundation and criteria of truth, or the sources of error; nor does the nature of right and wrong form any part of his instructions. These subjects are manifestly of much more practical importance than many that are actually taught.

3d. *The present system makes no provision for properly disciplining the intellectual or moral faculties.* Every one knows the force of habit, and the increased facility derived from continued practice; and most of our readers know that the human *mind* is no exception; we expect that a man who has been trained from childhood to reason correctly, and to act justly and generously, will continue to do so through life. Now, our present systems of popular education make no provision whatever for the formation of right habits of reasoning or feeling, or for developing the various faculties by means of proper and continued exercise In regard to the intellect, it is allowed to grow up as it likes,

every thing being taught by rote: the pupil is never once required to exert a single effort of independent thinking. We do not mean to say that no individual teacher ever requires such an exercise, but that his doing so forms no part of his prescribed duty.

In regard to moral character, it may be said that this depends more on the mother than on the teacher. Granting this to be true, it is still a manifest fact that *much* depends both on the example and the precepts of the teacher. Most children look up to a teacher as a sort of guide for their own conduct, and pay some regard to his precepts also. It is true that no habitually immoral character is appointed, yet the moral principles of a candidate are seldom closely scrutinized, and many are appointed whose views on such subjects are quite vague. So far as direct instruction is concerned, there is no provision whatever for imparting moral rules.

Education consists entirely of these three things, the communication of knowledge, either of facts or rules, the formation of tastes, and the disciplining of the faculties. In every respect, the present system is found deficient. While it aims exclusively at the first object, it effects even that only in a very partial manner. Hence, it deserves not the name of education: it is only a *smattering* of *instruction*, and the masses of our population, whether rich or poor, cannot properly be said to be educated: they are only not illiterate. The "fruits of the system" are manifest in the general prevalence of sensuality, avarice, crime, and error of opinion on every subject. On the last point, our population is a very Babel of confusion and contradiction.

The advantages that would result from such a system as that mentioned above, are so numerous, that we can mention only a few of the more obvious.

1st. *It would greatly diminish the devotees of sensuality.* All men desire happiness, and those who have no relish for mental enjoyments, *will* have recourse to grosser pleasures, of one kind or another. The signing of a pledge, or the threats of exposure will never put down intemperance or prostitution. We do not mean to say that the attempts to effect these objects have not produced much good to individuals; but we do say that, without

arrogating to ourselves the character of a prophet, we are very much mistaken if either of those objects will ever be accomplished till the community have acquired more thoughtful habits and purer tastes, by means of a good system of public education. A well-educated man understands how much evil may result from a single false step, and therefore he considers well before he takes any step on a new and untried course; whereas others generally imagine that a single false step may always be retraced with great facility; and hence they often heedlessly enter on a career which "leads down to the chambers of death." The former, again, finds a high degree of pleasure in exploring the truths of science and the records of past ages, or in contemplating "thoughts that breathe and words that burn;" while the man who has acquired no taste for such subjects, will seek to pass the time in carousing or gambling.

2d. *It would remove that extreme eagerness for wealth, which so often "drowns men in perdition."* This thirst for gain arises partly from sheer ignorance of the real requisites to happiness, and partly from a course of sophistical reasoning, which it is by no means difficult to detect, but into which persons of gross tastes and little mental culture are very liable to fall. Education would correct this evil by showing that wealth cannot purchase any one of the highest and most durable pleasures of which our nature is susceptible, and that the cares, anxieties, luxuriousness, pride, flatteries, &c., &c., attendant on opulence, are real evils, which are not counterbalanced by a single advantage over a bare competence. We know of no clearer manifestation of the advantages derivable from a good education, than the way in which persons are accustomed to sacrifice their present comfort and their future welfare, in the pursuit of an object which would appear, on careful consideration, to be an unmixed evil to them personally. Of the millions of Mammon's votaries, not one can give a single valid reason for his idolatry: all is sophistry and error.

3d. *It would exterminate crime and pauperism.* That crime would cease, appears from what has been already said. Pauperism, again, results from improvidence, indolence, or gross vice. We do not mean to assert that this is true in every individual

case; yet the records of our poor-houses show that the exceptions are few. The habits of self-respect, industry, temperance, and foresight, which result from a liberal education, would put an end to pauperism, so far as the community are concerned.

4th. *It would greatly promote public health and enjoyment.* An immense amount of the disease which afflicts the community, is solely owing to ignorance of the human constitution, and the laws of health; hence "when the cause was removed, the effect would cease." It would promote public enjoyment *directly*, by furnishing the people with those abundant sources of entertainment, derivable from good reading, and from studying the boundless fields of nature. It avails not to object that many are too poor to buy books, and too busy to read them, or devote any time to the study of nature: for there are few indeed, who do not squander more time and money, than would be necessary to enable them to spend many an hour very agreeably, and by no means unprofitably. It would contribute to public enjoyment *indirectly*, by putting an end to those scenes of vice and outbreaks of untutored minds, which not only mar the happiness of those immediately concerned in them, but are a source of annoyance to every one in their vicinity.

5th. *It would put an end to quackery and imposition, whether scientific, medical, literary, religious, or political.* It requires only a very little consideration, in order to see that all impostures owe their success either to ignorance, or to the thoughtlessness and incautiousness, which generally accompany them. Well-educated men would not believe promises, which science shows to be absurd; they would not believe assertions, which a knowledge of history and of the human mind, would show to be false; nor would they be misled by sophisms, which logic would enable them readily to detect.

6th. *It would greatly promote the interests of true religion and morality.* We would ask any man of common sense, who is most likely to attend carefully to the concerns of eternity, the man who has been trained up in thoughtful habits, or he whose thoughts have always been allowed to run riot? Who, again, is more likely to be a consistent and active christian, the man who has learned to make the short present, give way to the claims of the long future,

and thus to guide his conduct by fixed principles, or he who has been accustomed to act from the views and feelings of the moment, as uneducated persons are generally apt to do? Truth can never be established, except by dispassionate and careful scrutiny. However much some profess to decry reason, they will find that they have ultimately nothing else on which to stand, and that they can oppugn reason only by calling it to their aid. The very being of a God, the corner stone of all true religion, is proved solely by reason; and it is by means of reason alone, that we can confidently receive the Bible as a genuine, inspired record, and reject the Koran as the production of an impostor. Hence an education which would unfold the criteria of truth, and the sources of erroneous judgments, would tend to conduct us to the one, and assist us in avoiding the other, in religion as well as in science. However much men may differ in the *application* of the rules of legitimate reasoning, there is as little room for difference of opinion regarding the rules themselves, as in the case of mathematical propositions. True religion, as all allow, conduces to purity and integrity of conduct. Education would also raise the moral character of a community, by rendering them more attentive to consequences. It is easy to see that immorality is glaring folly, so far as the welfare of the individual is concerned, and that a simple consideration of consequences, would often deter from vice and dishonesty, men who are swayed by no higher motives than those of prudence.

If the reader ask whether we think that all these advantages would be realized at once, we unhesitatingly answer, that it would require two or three generations to realize them *fully.*

Parents who know little of the evils of irregular attendance, would often detain their children at home, and thus render their education defective. Domestic education would also, in many instances, be miserable in the extreme, and this would manifestly detract much from the benefits that would otherwise result from a good public education. Such cases would be, for sometime, so numerous, that well-disposed youths would be exposed to various temptations, which otherwise would not exist. This circumstance should never be overlooked, in estimating the effects of education on an individual *at present.* He goes out among a mass of uned-

ucated, and often unprincipled youths, who give the *tone* to such society, and who surround him with snares at every step. These evils would cease to exist, when all were "trained up in the way they should go." Then the tendency of the general tone would be reversed. The next generation would have more enlightened views, and possess a much better system of domestic education, a subject which should occupy a prominent place in the instructions of the public teacher, and which we consider a very important department of the moral sciences.

Of the many objections that might be urged against such a system, we need only consider a few. The first, and indeed the principal, is the supposed enormous *expense* of such a system. Why, it will be asked, tax the rich so heavily for educating those with whom they have so little connexion? We reply that the expense to the community at large, would not be increased in any degree, in the same ratio as the number of pupils; if the time permitted, we could show our readers that in cities and large villages, and even in a dense rural population, the average expense would not exceed three dollars per quarter, not one-fourth of what is now paid by very many of our citizens, for an education much inferior to what might thus be secured to all. The money which is now worse than squandered on alcohol and tobacco, to say nothing of various similar outlays, would more than pay all the additional expense. That such a system would put an end to all those sources of expenditure, cannot be doubted by any one, who attentively considers the subject. The saving of expenses by the diminution of crime, by the greater ability and integrity of public and private functionaries, by greater mutual confidence, and by improved habits of industry and domestic economy in general, would be so much clear gain, viewing the subject simply in a pecuniary point of view. The rich man's taxes for such a purpose, would not amount to one half of what he now pays, one way or another, without receiving any benefit in return. He will find that the expenses of a good public education are a trifle, compared to the evil of having his children surrounded by persons of uncultivated minds and gross manners, and having *all* his property at the mercy of men who may become at any time, the dupes of crude theories or

of designing demagogues. The masses of this country possess supreme control over legislative action, and any attempt to deprive them of their present rights, would be either abortive or productive of endless civil commotions. Hence as the "people" possess so much power, it is extremely important that they should be guided by good principles and enlightened views.

Another plausible objection is, that the poorer classes could not avail themselves of the benefits of such a system, since it would be too great a tax on their children's time. We reply that five hours a day, for forty-two weeks in the year, till they were of age, would be amply sufficient for the purpose. Apprentices' employers would have no objection to giving them more time, when they were to be rendered more steady, trustworthy and skilful; they would gain by the exchange as much as the employed. The time of study could be fixed so as to suit the particular circumstances of the locality. What the poorer classes now do, proves conclusively that, as a body, they would gladly avail themselves of the benefits of such a system.

That a system of this kind will ultimately be adopted, we feel very confident; for we cannot believe that our community will be forever content to submit to the evils of the present state of affairs, when a remedy is at hand. Yet persons cannot directly appreciate that of which they are profoundly ignorant, and hence we have no expectation that such a system could be introduced at once. But we know at the same time, that many of our readers can perceive the force of every thing we have urged, and that even uneducated men, may see so much of the fruits of a good education, that they would go a considerable way, merely as an experiment. We think, therefore, that we do not give the people of this and the neighboring states, too much credit for intelligence, when we expect that on mature reflection, they would adopt the following plan.

1st. To make the common schools entirely free, and procure a higher standard of qualifications, by raising the salaries, and making the situation permanent, while the teacher gave general satisfaction, instead of making an agreement for six months, as is very often done at present.

2d. To increase the grants to the higher seminaries, so that every youth in humble life, who exhibited proofs of extraordinary abilities and proficiency in the common schools, might receive the best education free of any charge, the validity of any claims to such a privilege, to be determined by the people of the vicinity, after witnessing the examination, and hearing the report of persons appointed for that purpose. The proposal which has found favor with several of the people of New York, to diminish the allowance to the higher seminaries, and pay the money to the common schools, we cannot denominate otherwise than preposterous and aristocratic, in the worst sense of the term. It is preposterous, because all the public money received by the higher seminaries would hardly give ten dollars a year to every common school; and we ask, in the name of common sense, whether *such* an increase would procure a higher grade of teachers? Again, the measure is aristocratic, or rather oligarchic, because it tends to confine education to the richer classes exclusively: for while it would have no appreciable effect in improving the common schools, it would place a good education above the means of many talented youths, who, as matters now stand, can pass through the higher seminaries. A more cunning scheme to exclude the poorer classes from office, and destroy their political influence, could not be devised. In our state of society, uneducated, can never compete with educated talent; and hence *the only way to prevent our republican institutions from being either a mere name, or a nuisance, is to provide the people with the means of a good, free education.* P. M.

Photogenic Drawing.

BY C. H. ANTHONY, A. M.
Principal, Albany Classical Institute.

We live in a world of wonders—our age is an age of wonders. He who has a heart to admire the beauties of nature and art will find full employment for his sentiments of admiration; and he who loves to *adore* has only to look around, and he will perceive objects enough to raise his thoughts to the Author of Good.

To study the laws of the universe, as instituted by the wise Creator, and developed by the great minds who have gone before us as pioneers in the domain of science, is at once both sublime and pleasing; but to discover those heretofore unrevealed, and apply them to the increase of human enjoyment, must constitute the highest and purest source of happiness that this world can afford.

We envy, without much compunction of conscience, the inventor of the telescope, of the mariner's compass, the art of printing, and of steam navigation. We would not refuse the honors bestowed on the memory of him who discovered the laws of specific gravity; or of him who unfolded the principles of universal gravitation; or of the astronomer, who first taught us to trace the course of the erratic comet; or of that benefactor of the human race, who redeemed chemistry from the vagaries of the alchemist; or of him who founded the science of geology; or, finally, of that man who conceived by rational deduction the existence of a new world, and demonstrated it by actual discovery.

The emotions with which we contemplate the achievements of these, and a host of others, whose labors entitle them to equal consideration among their fellow-men, are so familiar to us, that it is barely necessary to refer to their existence:—enlargement on this point is entirely superfluous. But what might we suppose the venerable Galileo would say, if he could have been permitted to have burst his "marble cerement," and behold the stupendous telescope of Dr. Herschel? With what pride would John Faust, or William Caxton, look upon the beautiful movable types with which every printing-office is now furnished, not even excepting those in the heart of barbarous India, on the island of New Holland, and the coast of Africa! Did Franklin, when he almost literally "wove his garland of the lightning's wreath," ever dream of an electro-magnetic locomotive? How faithless would he have been if any one had predicted that the mysterious spark which he drew from the clouds, would yet be made to propel machinery, or assist in the more rapid transmission of telegraphic dispatches! Let Archimedes arise now, and behold the present advanced state of philosophical science; or imagine Newton and La Place to

return, and find their most important truths taught in our schools as *elementary principles;* or Dr. Black to enter a modern laboratory, and hear a lecture on *potassium* alone; or Werner to revisit the earth, unfold the volumes of Buckland, Conybeare, and others, or listen to our own eloquent Silliman, and realize, if you can, the mingled feelings of wonder and joy which must possess their inmost souls. I may say *imagine*, for it were impossible to describe them. We can all recollect when a trip from Albany to New-York, by steam, required thirty-six hours, and it was deemed a luxury even at that. We probably remember, too, how incredulous we were, when told that the "Sun" would go shortly through by daylight.

In view of this, it will not be difficult for us to realise the astonishment of Robert Fulton, could he rise from the dead, and be permitted to mark the success with which we now prosecute, and the benefits we derive from, his favorite project of navigation by steam. How would his bosom swell with honest pride could he behold the glorious result for which his genius and perseverance had prepared the way. He might recollect the wagging head, the dubious smile, or the more open sneer with which his first proposals were met; and which did not cease even when the projected plan was shown to be feasible,—but the memory would no longer give him pain. In the feelings of triumph which he could not but experience on beholding the improvements of the present day, he would find an ample reward for all that he did, a compensation for all that he suffered.

The bearing of these remarks upon the subject we are now considering, is sufficiently obvious. It is now but a few years since we were first informed of the experiments of M. Daguerre. When it was announced in the papers that a process had been discovered by which landscapes, views of buildings, &c., could be taken with perfect accuracy, and in a very few minutes, we were inclined to treat the matter as another "moon hoax," and M. Daguerre as one fully qualified for a partnership with its author. The Daguerreotype is now to be met with in almost every section of our land; and the untutored savage now sees a

wonder, whose very existence was just now a subject of doubt to his enlightened neighbor.

The word "Photogeny" is compounded of *Phós*, light, and *Geinomai*, I produce; and implies that, in the kind of drawing to which the term is applied, *light* is the prominent agent.

It is not a matter of surprise that chemists, after having become fully acquainted with the nature of nitrate of silver, and the power of light to change its color, should seize upon that property for the purpose of applying it to photographic drawing. Since labor-saving machines are all the rage, might not landscape and portrait painters avail themselves, with propriety, of any advantage which they might gain in using the Sun to draw their designs, and furnish their pictures? Surely they had toiled long enough in the *old-fashioned* way, and it was now time for something new to appear. Sir Humphrey Davy and Mr. Wedgewood instituted a series of experiments, as early as 1802, for the accomplishment of the desired object. These were founded upon correct theory, but proved unsuccessful, owing to a defect in the management of their details. They, indeed, obtained impressions of houses, &c., but these were indistinct and evanescent, no means of *fixing* having been devised by the first experimenters. They were fully aware of the service which might be rendered by the camera obscura in taking these views; but they knew no method of rendering paper sufficiently delicate for the reduced light of the camera. The failure of such men as these discouraged others, for a long time, from making any similar attempts.

The first successful experiment in this department of science is said to have been instituted by M. Neipce. M. Daguerre, however, made the first public announcement, and the discovery was deemed of so much importance, that the French Academy of Sciences expressed an unanimous opinion that he was deserving of a reward; and application was accordingly made to the government for the bestowment of one. Whereupon Mr. Talbot made declaration that he was first in the field, having succeeded by a process different from that of M. Daguerre, but founded upon the same principles. Mr. Talbot's method is as follows: viz. Paper is

selected of a good, firm quality, and possessing a smooth surface: writing paper, No. 1, is the most suitable.

This is dipped into a weak solution of common salt, wiped dry, and then overspread on one side with a solution of nit. silver, and dried by the fire. It is then fit for use—the nit. of silver is dissolved in six or eight times its weight of pure water. There is a certain proportion to be observed between the quantity of salt and of nit. silver employed, which is best ascertained by experience. By repeating these operations at intervals of a week or two, the paper is rendered extremely sensitive. Many experiments are often made before the operator learns all the minutiæ necessary to the attainment of a satisfactory degree of success. Paper carefully prepared in the manner just described, is susceptible of the most delicate impressions. "Nothing can be more nearly perfect, than the images it gives of leaves and flowers, especially with the aid of a bright summer's sun. The light passing through the leaves delineates every ramification of their nerves. Even the *cilia*, or minute hairs on their edges, are made manifest. When Mr. Talbot commenced his experiments, he scarcely expected to do more than to obtain on his paper a well-defined shadow, transient indeed, but which might be preserved for a short time in a dark place, and viewed by the faint light of a taper. He did not dream of being able so to fix the impress, as that it might be examined at all times and under all circumstances, without any apprehension of its being destroyed by the influence of light. Much less could he have imagined that the same means which were used to render the paper sensitive in the first place, might be employed to destroy its sensibility whenever it should be desirable to do so. Yet such is the fact. After the paper has received the picture, he has only to immerse it in a solution of salt, wipe it carefully, and dry it: by this means the view may be retained for years. The images thus obtained are white, on a colored ground, which may be blue, yellow, brown or black, according to the proportion in which the materials are united. Indeed, almost any color but green may be obtained. Why this should be excluded is not known: but it would form a curious subject for philosophical investigation. Mr. Talbot, in order to convey an idea of the degree of accuracy with which some objects can be imitated by this process, gives the following instance:

"Upon one occasion having made an image of a piece of lace, of an elaborate pattern, I showed it to some persons at a distance of a few feet, with the inquiry whether it was a good representation, when the reply was, "That they were not so easily deceived, for it was evidently no picture, but the lace itself." Among the many interesting results obtained by Mr. Talbot, we can only glance at a few. He has succeeded in the almost incredible operation *of fixing a shadow;* he has transferred paintings on glass, and obtained (in this case only) a transfer of the colors; he has taken the shadows of objects magnified by the solar microscope, using his prepared paper instead of a screen; he has applied his method to the taking of landscapes, architectural views, &c. causing a building, as he expresses it, to draw its own picture. His method has been found useful in delineating sculpture, and copying engravings; and may, doubtless, be employed in taking portraits. In connection with this exhibition of Mr. Talbot's process, it may be well to notice some important and highly interesting discoveries that have recently been made by Sir John Herschel, in relation to the action of the extreme red rays of the prismatic spectrum upon the sensitive paper just described.

I quote from a communication made by him to the British Association for the Advancement of Science. "The extreme red rays (such I mean as are insulated from the rest of the spectrum, by a dark blue glass, colored by cobalt, and which are not seen in the spectrum, unless the eye be defended by such a glass from the glare of the other colors), not only have no tendency to darken the prepared paper, but actually exert a contrary influence, and preserve the whiteness of the paper on which they are received, when exposed at the same time to the action of a dispersed light, sufficient of itself to produce a considerable impression. I have long suspected this to be the case, from phenomena observed in taking photographic copies of engravings; but having at length obtained demonstrative evidence of the fact, I think this may not be an improper opportunity to announce it. When a slip of sensitive paper is exposed to a highly concentrated spectrum, a picture of it is rapidly impressed on the paper, not merely in *black*, but in *colors*. In order to understand what follows, it will be necessary to describe

the colors so depicted. The red is tolerably vivid, but is rather of a brick color than of a pure prismatic red; and what is remarkable, its termination falls materially short of the *visible* termination of the spectrum. The green is of a sombre, metallic hue; the blue is still more so, and passing rapidly into blackness. The yellow is deficient. The whole length of the chemical spectrum is not far short of double that of the luminous one, and at its more refrangible end, a slight ruddy, or pinkish hue, begins to appear.

It is impossible in this climate to form a brilliant and condensed spectrum without a good deal of dispersed light on its confines; and this light, if the exposure of the paper be prolonged, acts of course on every part of its surface. The colored picture is formed, therefore, on a ground not purely white, but rendered dusky over its whole surface, *with one remarkable exception*, viz., in that spot where the extreme red rays fall, the whiteness of which is preserved, and becomes gradually more and more strikingly apparent the longer the exposure, and the greater the consequent general darkening of the paper. The above is not the only singular property possessed by the extreme red rays. Their action on paper, already discolored by the other rays, is still more curious and extraordinary.

When the spectrum is received on paper already discolored slightly by the violet and blue rays only, they produce not a white, but a red impression, which however, I am disposed to regard as only the commencement of a process of discoloration, which would be complete, if prolonged sufficiently. For I have found that if, instead of using a prism, a strong sunshine is transmitted through a combination of glasses carefully prepared, so as to transmit absolutely no ray but that definite red at the extreme of refrangibility, a paper previously darkened by exposure under a *green* glass, has its color heightened from a sombre neutral tint, to a bright red; and a specimen of paper rendered almost completely black by exposure to daylight, when exposed for some time under the same glass, assumed a rich purple hue; the rationale of which effect, I am disposed to believe, consists in a very slow and gradual destruction, or stripping off, as it were, on

layers of color, deposited or generated by the other rays, the action being quicker on the tints produced by the more refrangible rays, in proportion to their refrangibilities. It seems to me evident that a vast field is thus opened to further inquiries. A deoxydizing power has been attributed to the red rays of the spectrum, on the strength of the curious experiments of Wallaston, on the discoloration of tincture of guaiacum, which ought to be repeated; but in the sensitive papers, and still more in Daguerre's marvellous iodurated silver, we have re-agents so delicate and manageable, that every thing may be expected from their application. A communication of this nature, coming from such a source, invests the subject with a degree of importance, which we could scarcely be expected, at first thought, to accord to it.

We are indebted to Mr. Robert Hunt, of Falmouth, for the invention of an improved sensitive paper, by the use of which all the operations in this branch of Photography may be greatly facilitated. He entitles his new process the Energiatype.

The following description is given in his own languages: "Good letter paper is first washed over with the following preparation, viz:

A saturated solution of succinic acid,	2	drachms.
Mucilage of gum arabic	½	do.
Water	1½	do.

When the paper is dry, it is washed over once with an argentine solution, consisting of one drachm of nitrate of silver to one ounce of distilled water.

The paper is allowed to dry in the dark, and it is fit for use. It can be preserved in a portfolio, for any length of time. This paper is a pure white, and it retains its color, which is a great advantage. At present, I find it necessary to expose this prepared paper in the camera obscura for periods, varying with the quantity of sunshine, from *two* to *eight* minutes; although, from some results which I have obtained, I am satisfied that, by a nice adjustment of the proportions of the materials, a much shorter exposure will suffice. When the paper is removed from the camera, no trace of a picture is visible. We have then to mix together one drachm of a

saturated solution of sulphate of iron, and two or three drachms of the mucilage of gum arabic. A wide flat brush, saturated with this solution, is now swept over the face of the paper, rapidly and evenly. In a few seconds, the dormant, images are seen to develop themselves, and with great rapidity, a pleasing negative photographic picture is produced. The iron solution is to be washed off as soon as the best effect appears, this being done with a soft sponge and clean water. The drawing is then soaked for a short time in water, and may be permanently fixed by being washed over with ammonia, or perhaps better, with a solution of the hyposulphite of soda, care being taken that the salt is afterwards well washed out of the paper. From the pictures thus produced, any number of others, correct in position, and in light and shadow, may be produced, by using the same succinated papers in the ordinary way, from five to ten minutes in sunshine, producing the desired effect. The advantages which this process possesses over every other, must be, I think, apparent. The papers are prepared in the most simple manner, and may be kept ready by the tourist until required for use: they require no preparation previous to their being placed in the camera, and they can be preserved until a convenient opportunity offers for bringing out the picture, which is done in the most simple manner, with a material which can bo anywhere procured.

Although M. Daguerre pursued his enquiries upon the same general principles as those which guided Mr. Talbot, yet he has adopted a *modus operandi* essentially different. He uses a copper-plate covered with pure silver, instead of the photographic paper. His method is thus. The copper-plate is made as uniform in thickness as may be, and the plated side is polished to the greatest possible degree. Care is taken to have this surface *quite even*, that there may be no defect in the figure. Any impurity in the silver would greatly mar the beauty of the impression. After the plate has been duly prepared, it is placed in a suitable box, and there exposed to the vapor of *Iodine*, raised not by natural heat, but by spontaneous evaporation. A veil of gauze, or velvet, is laid over the box, in order to diffuse the vapor as equally

as possible. Every precaution must be taken to prevent an accumulation of iodine upon any one part of the plate. The film of iodide of silver thus produced, is so thin as almost to defy calculation. When the combination is complete, the surface of the silver exhibits a gold color. This is the point at which the plate must be removed, it being now prepared for the reception of the image

Care must be taken to preserve it from exposure to the light. which would speedily destroy its susceptibility of taking impressions. It cannot now be placed in the camera *too soon*, although we may keep it without injury *in a dark place* for an hour or two. In the Camera, it occupies the place of the ground glass. It is preserved from the contact of light by a small door, or slide, which is not opened until the arrangements are complete. The Camera having been adjusted, so that the focus of the lens shall be upon the glass screen, the frame containing the plate replaces the glass, the slide is withdrawn, and the light begins to act. This part of the operation occupies from ten to fifty seconds. The time required is modified by latitude, season, hour in the day, and color of the object. That portion of the day which is most favorable for taking views, is from 7 o'clock A. M. to 3 P. M., and it requires about twice as much time in September as it does in June or July. A clear sunny sky, as that of Spain or Italy, has a great tendency to expedite this part of the process. A longer time is required, if the object is in the shade, than when the sun is shining upon it. When taken from the Camera, the plate presents but few traces of the design, and in many cases, no visible effect is produced until it has passed through the next stage of the process, in which it is subjected to the action of *mercurial vapor*, in a box provided with a sheet iron bottom, raised from the table sufficiently high to admit of an alcohol lamp being placed under. Theory would direct us to lay the picture in a horizontal position, as being the one in which the sublimated mercury would act with most uniformity; but experience says otherwise. Operators have learned by observation, that, at which they never could have arrived by any course of reasoning, and which no hypothesis can account for in a satisfactory manner; viz: that the proper position for the plate,

when it is intended to view the picture *vertically*, is at an angle of 45°; *and vice versa.* Mr. Talbot, in alluding to this curious fact, says: "This is altogether extraordinary; for who ever heard of masses of vapor, having determinate sides, so as to be capable of being presented to an object at a given angle? We need "more light" on this point; and it is really to be hoped, that some competent person will give it a full investigation." The degree of heat required for sublimating the mercury, is about 170° F., and this is continued until the experimenter can discover a well-formed image, by looking through the glass in one side of the mercurial box. The plate is then withdrawn from the box, and subjected to the "*fixing process.*" This consists in plunging it into a solution of *hyposulphite of soda*, or of common salt, and afterwards washing with pure water, to remove the salt, and secure the view against the further action of light. The salt is said to act principally upon those parts which the light does not effect; while the mercury acts upon those which have been influenced by the solar rays. The whole operation being now complete, it only remains to preserve the picture from friction; which may easily be done by putting it in a frame, and covering with a glass. It can be erased at any time, by rubbing with anything which will not injure the polish of the plate. After the picture has been perfectly developed, in the manner just described, it may be rendered much more distinct and beautiful by *gilding*. This operation is performed by pouring on the plate, a very dilute solution of muriate of gold, and subjecting it to a moderate degree of heat. The outline now becomes more sharp, and the lights and shadows more apparent. Although the figures are thus impressed upon the plate by the action of light, yet after having been once fixed, it is impossible for the most intense glare of the sun to change them. They are, moreover, so accurate in their details, as to bear the scrutiny of a powerful microscope. It ought to be well understood, that the object whose image is taken, must be in a state of perfect rest. During some experiments that were made with the Daguerreotype in Europe, a hackney coach came within the field of view. An exact representation was, of course, made upon the metallic

surface; but with *one slight deficiency*, one of the horses *having turned his head*, while the operation was going on, was portrayed on the picture, *acepalous*. At another time, a shoe-black in the exercise of the duties of his vocation, was delineated *without arms*. We can perceive from these facts, that it is impossible to obtain a satisfactory image of the *trees*, which may form part of a landscape, unless there is almost a perfect calm. Care is requisite not only to guard against motion in the object, but also to keep the plate free from dust. The operation of *washing*, too, requires much caution. It is not difficult to destroy the beauty of the finest picture, by a want of attention to these minutiæ. Mr. Talbot professes to have conceived the idea of using a silver plate, prepared with iodine for photogenic drawing, before any announcement was made on the subject, by M. Daguerre; but the idea of developing the picture by the mercurial process, never occurred to him, and he therefore turned his attention to the preparation of a sensitive paper, in which he succeeded, as has been already described. M. Daguerre has recently made known to the Paris Academy of Science, a new process, by which he obtained better impressions than he did by the old one. It is as follows: Polish the plate with sublimate and tripoli, and then with rouge (colcother) until a fine black be obtained. Place it in a horizontal flame, and pour over it a hot solution of cyanide of mercury. The mercury will be precipitated, forming a white coating. Allow the plate to cool a little, pour off the liquid, and dry with cotton and rouge. Polish the white coating deposited from the cyanide of mercury, and rub this coating with a ball of cotton, saturated with oil and rouge, until the surface is of a fine black. Now put the plate again in the horizontal plane, and pour over it a solution of platina and chloride of gold. Heat the plate, and then suffer it to cool; pour off the liquid, and dry with cotton and rouge. In doing this, care must be taken to *dry* merely, *not to polish*. The plate is now ready for the camera. This method is said to be preferable to any other, particularly for taking portraits. The question is often asked, whether these views can be transferred to paper, and be made to serve the purpose of an engraving? I do not know that

the experiment has ever been tried in this country, although it is said that an artist in Europe has succeeded in it. If so, it must have been either by passing the graver over the lines, or by coating the plate with some substance, which will not affect the delicacy of the impression, while it secures the parts upon which the light has not acted, against the influence of acids, and thus enables the operator to *etch* the drawing upon the plate. Having now considered some of the most curious and interesting phenomena ever presented to our contemplation, we may very properly ask, What is the rationale? M. Arago confesses that the sciences of optics and chemistry united are insufficient, in their present state, to give any plausible explanation of this delicate and complicated process; and Mr. Talbot observes, that "if M. Arago, who had the advantage of being for six months acquainted with the secret, and therefore of considering its nature in all points of view, was of this opinion, it seemed as if a call were made on all the cultivators of science to use their united endeavors, by the accumulation of new facts and arguments, to penetrate into the real nature of these mysterious phenomena." He relates the results of a few experiments, which will undoubtedly aid much in the formation of a theory, whenever any person fully competent to the task shall attempt to establish one. They are briefly as follows: Exp. 1st. Place a particle of *Iodine*, of the size of a pin's head, on a plate of silver; warm it gently, and you will shortly see the particle surrounded with colored rings, whose tints resemble those of Newton's rings. Now, if these colored rings are brought into the light, a most singular phenomena occurs; for the rings prove to be sensitive to the light; their colors change, and in a short time their original appearance is quite gone, and a new set of colors occupies their place. These new colors are altogether unusual ones. They do not resemble anything in Newton's scale, but have a system of their own. In the centre, the silver becomes *white*, like ivory. On being heated, it turns yellow, and it regains its whiteness as it grows cold. Rings of iodide of silver thus formed, substituting *silver leaf* for the plate, possess the singular property of transmitting light. Exp. 2d. A copper-plate

was spread over with nit. mercury, rubbed very bright, and placed in the iodine box. The result was the formation of colored rings of the greatest splendor, and of large size. They did not appear in any degree sensitive to light. Exp. 3. If a piece of silver leaf be exposed to the vapor of iodine, however uniform the tension of the vapor, it does not combine uniformly with the metal; but the combination commences at the edge of the leaf, and spreads inwards, as is manifested by the formation of successive bands of color, parallel at the edge.

The following observations and queries are naturally suggested by the foregoing results:

Why is a copper-plate coated with silver preferable to one of *pure silver*? Is there any voltaic action? Yellow passes into *purple*, by too long continuance in the box, or by exposure to light. Why should two causes so dissimilar produce the same effect? The yellow is, undoubtedly, a perfect iodide. Is the *purple* also? May there not be two perfect yellow iodides, and the purple be composed of fractional parts of equivalent proportions? Is not the purple more superficial than the yellow? Does not its presence assist in rendering the lines of the figures visible? Are not those figures principally formed by an amalgam of silver with vaporized mercury? Why must the plate be placed at an angle of 45° in the mercurial box? Is there an electric influence?

This utilitarian age would, doubtless, be greatly edified by an astute speculation, in regard to the various uses to which this curious invention we have been considering, may be applied, and the amount of probabilities that exist in favor of its superseding the arts of landscape and portrait painting, engraving, lithography, &c: but the space already occupied by this article forbids us, at present, to enter into an investigation of that kind. Calling too, as it must do, for a large exercise of our imaginative powers, it would scarcely be expected in this dissertation. Still, as our thoughts will naturally turn in that direction, I beg leave to offer, in conclusion, a few leading reflections.

What important benefits are yet to be derived from this invention we know not, nor *can* we know; but we may, with profit,

glance hastily at the practical results already attained It is unnecessary, at this late day, to say anything in regard to *Photographic Portraits*, since they are now to be found throughout the length and breadth of the land; and the community has formed an estimate of their value. Unlike the product of the limner's art, they *must* be true to nature No flattery can be admitted here. Form, features, and expression, are correctly represented. The police of Paris have found in the Daguerreotype a very important auxiliary. By means of this instrument, they are enabled to obtain likenesses of the criminals incarcerated in their prisons; which portraits they append to the written descriptions contained in their records. If one of these gentry, after having been released, should return to his old practices, it is scarcely possible for him to escape the aggravated punishment due to his repeated crimes. Suspected persons, too, frequently obtain the unsought honor of having their portraits taken at the public expense. This cannot but operate as a powerful check on the commission of crime since few can be found so hardened as to violate the laws, with the certainty of detection staring them in the face. It may require a few years for the benefits of this system fully to develope themselves, but, sooner or later, they will be seen, felt and acknowledged. Another use to which this instrument has been applied, is that of enabling the traveller to bring home portraits of distinguished characters, views of scenery, and correct delineations of works of art in all their variety. The monuments of ancient architectural skill, whether entire, or in ruins, may now be represented with a fidelity that will challenge admiration, even from the critic. The success of Mr. Stevens in this enterprise has removed all doubt in regard to its practicability; and artists are at this present time abroad in every land, laying the foundations for an illustrated history of the whole human race. Some are among the Aborigines of America, inscribing upon metallic tablets the lineaments of a noble race, fast passing away; while others are roving through the ruins of Egypt, Greece, and Rome, and taking faithful transcripts of all that the architecture of past ages presents of the majestic or beautiful. Thus we see that science is en-

riched, the arts of life improved, and the cause of morality greatly aided by an invention that had first promised to be *curious* rather than useful. Any one who has studied the history of inventions and discoveries, or been attentive to those changes which have taken place within the period of his own observation, must have remarked that the most important results often succeed trifling causes, and the most useful inventions have originated in a single thought, which, having been seized upon by the philosophic mind, is carried out in its various relations, and those relations rendered subservient to the demands of practical life. Finally, it may be remarked that those persons are the real benefactors of their race, who take the principles which themselves or others lay down in the abstract, and reduce them to a practical form, so that the whole community may understand and apply them to the attainments of appropriate results.

On the Nebular Hypothesis—Effects of Recent Telescopic Revelations.

WHOEVER may have been the inventor of the telescope, the honor of its first application to astronomic discovery, i ndisputably belongs to Galileo. In his hands, it first lifted the veil that for so many ages divided the visible heavens from the invisible, and displayed to wondering gazers things so strange that nothing but positive proof could overturn the stable and the old. The greatness of a discovery may sometimes be very properly estimated by the opposition which it meets. The more novel, and opposed to the previous order of things, the more earnestly will it be combatted, scoffed at, and, if with the old there reside the '*vis et arma*,' the more will it be persecuted. We are anxious to believe, and may not be wrong in doing so, that scientific progress has brought with it more liberality of sentiment, less bigotry, greater toleration; and the splendor of past achievements, in all its domains, will have but a stronger tendency,

whenever future discoveries are developed, to lead us to coincide with Shakespeare, "That there are more things in heaven and earth, Horatio, than are dreamed of in thy philosophy."

The number of those who make it a principle to doubt and declare themselves incredulous on every subject of scientific moment, is every year growing less. The wonders in all branches of science, surpass the creations of romance.—The fervid fancies that peopled the blue above us with fairies, flitting through it from place to place as their caprice dictated, have given place to large and comprehensive ideas of myriads of intelligences, more gifted than man, peopling those countless worlds, which the telescope has opened to our view. Even the gnome, dwelling in the centre of our earth, growling in fabulous and fearful noises, and shaking the firm ground we tread with earthquakes, has resigned his power of awakening our wonder and alarm, since the startling and bewildering revelations of geology have displayed those gigantic forces, which have elevated the mountain summits, and disturbed the foundations of the great deep. It is only by the application of philosophic research to the common purposes of life, that this barrier of incredulity can be broken down: once accomplish this, and a sympathy between common life and scientific research is established. Philosophy is never more truly great than when displaying its treasures, with an ardent desire to multiply, cheapen, and render more secure the comforts of life. There are few minds of so limited capacity that cannot appreciate, to some extent, the value of those labors which have facilitated our inland transportation; that guide with unerring uncertainty the mariner across the pathless deep; that bringing the threatened bolts, which hang in portentous clouds over our dwellings, can conduct them harmless downward, and scatter them in the earth beneath; of the same wonderful applications of genius, that make the winged lightnings our messengers, and annihilating time and space, will doubtless yet tend greatly to strengthen affection, multiply intercourse, and bring into one vast compact brotherhood, all nations of men that dwell on the face of the earth. These are but a few examples of

what science has done, and is still doing for man's comfort and happiness. Judging of the future by the past, it is no chimera, and it is a plain prophecy, which each succeeding year is bringing nearer sober fact, and rendering more indisputable, that the time may not be far distant, when the wilderness shall bloom and blossom as the rose.

In the age in which Galileo lived, but little progress had been made in those modern improvements, upon which we all look with so much complacency, because they are common. Science was emerging from a state of society but half civilized. Round and round in the same beaten path, with measured footstep, each as near as possible in the track of its predecessor, had they marched; the old was tolerably sure and fixed; the terra cognita was a land well defined; on the other hand, the terra incognita was a dreary, misty region, requiring different modes of thought, new opinions, and after all, what was offered, thought they, but very questionable advantages; besides, had not things gone on nearly so, for so long a period. We can all laugh, without any feeling of contempt, at the splenetic puerility and contumacious sputtering, with which the announcements of Galileo's telescopic discoveries were met, because we can understand the feelings of that age. The ridiculous display which one of his philosophic enemies makes in the history of those times, will, we hope, prove a standing caution to all future doubters, who, like those sons of Mars, whose valor consists in an excess of prudence, make it a virtue to be incredulous. They are not all dead—although, as we have before stated, we believe their ranks are growing thinner; even those of the same mind as the old philosopher, who declared that if he were to see Jupiter's satellites, he would not believe his own senses—thereby verifying the old adage, "there are none so blind, as those that will not see."

Despite all the arguments and paper wasted to show that it was a mere absurdity, the moons of Jupiter held their accustomed course, and this distinguished genius was only stimulated to fresh improvements, followed by more curious discoveries. Although the Copernican system was not based on the discoveries of this instrument, nor did Kepler derive any assistance therefrom, in

deducing his celebrated laws, yet it is worthy of remark, that the phases of Venus afforded the strongest corroborative testimony of the truth of the Copernican system. Without any possibility of demonstration within their reach, it had been alike asserted by Copernicus and his opposers, that if the new theory was true, Venus would present a horned appearance, varying according to the earth's position, and that of the planet.

Galileo, sagacious and inventive, when he died left the instrument in a comparatively rude state. Two glasses, one convex, the object glass, and the other the eye glass, of concave form, arranged at proportionate distances, formed the simple instrument with which he brought near Jupiter's belts, Saturn's rings, the phases of Venus, and the phenomena of the Moon.

Passing from this rude instrument to the more recent erection of Lord Rosse, the "leviathan of Parson's town," what a vast change—how many failures—how much ingenuity uselessly expended, do we find between! In Galileo's hands, a portable toy; at Parson's town, a tube 56 feet long, and seven feet in diameter; with a speculum weighing nearly four tons. There can be no comparison between the results achieved in the two cases, but we question whether more than a per centage of the wonder and curiosity, which the former elicited, will ever be felt for the discoveries of the latter.

It would be difficult to state the amount of gratitude the scientific world owe to Lord Rosse, for the erection of his noble instrument. Tycho Brahe, a noble of high rank, left the allurements of a court, and fitting up the island of Uraniberg, in a style of princely magnificence, devoted his life to the perfection of his ingenious instruments; and though the cabals of a clique, poisoning a monarch's ear, rendered that monarch ungrateful, yet the admiration of his own age and of posterity, has amply compensated by placing high on the rolls of immortality the name of Tycho Brahe.

Amid the luxury and extravagance of a dissolute age, England may well glory in this, that she can point with conscious pride to one of her own nobles, who is devoting the best years of his life

to the perfection of the noblest of sciences. Undaunted by the profound secret in which Wm. Herschel kept his process of polishing his speculum, and the repeated failures of successive attempts since that time, the perseverance he has displayed since 1826, in spite of difficulties and expense, deserves the highest commendation. When rank and wealth turn aside to those pursuits, from which an exalted station generally excuses its possessor, it is doubly honorable and meritorious. To break through the trammels of a false caste, requires a genius and a love for science, seldom found in elevated spheres. Our earnest hope and belief is, that astronomy, that science which he is laboring to advance, will enrol his name on the pages of her history, beside the names of Galileo and Herschel.

The constitution of nebulæ, was a question for which the scientific world were anxiously looking for a solution from the observations of Lord Rosse. For the mass of information on these bodies, we had been indebted to the labors of the elder Herschel. With his noble instrument, and assisted by Miss Caroline Herschel, a name honored in astronomical science, he has located upwards of two thousand, and elevated into a question of great importance, the subserviency of these bodies in the economy of the universe. Nothing tends to quell all ideas of pride and self-importance, so much as a survey of the immensity of that universe which the telescope has unfolded. The sharpest unaided eye, on a clear night, reckons the shining points that stud the vault above it, by a few thousands, the telescope by millions. Add to this latter, the numbers of nebulæ, resolved into myriads of glittering grains—the suns of other systems, and quantities are given so enormous as to defy all computation, all conception. The expression of such vast sums, like those in which astronomy deals so largely, has with it one drawback; the vagueness it induces, forces us to think of them as unity; we cannot individualize. The feet of the spectator on the sea shore, treading upon heaps of grains vastly beyond the grasp of his arithmetic, is in the condition of the observer of the heavens. Infinity, not abstractly, but infinity as far as the present highest development of human powers is concerned, can only quell our

curiosity. Into the contemplation of so vast a scene did the strong genius of Herschel, assisted by his telescope, launch itself; a genius developed at that period of life, when mental habits are in most men unchangeably fixed—when it becomes so hard to enter upon any science, with the indefatigable industry required. No obstacles, however, were sufficient to daunt or discourage him; and he, the music master, turned from the harmony of sounds, to the study of that celestial harmony of suns and systems, that move on,

> "Forever singing, as they shine,
> The hand that made us — is divine."

The labors of preceding astronomers had made the world familiar with the existence of filmy or nebulous appearances in the heavens. Some of these their telescopes had resolved into component stars, and from such deductions it was inferred that increased power was only needed to resolve all. Such, too, seems to have been Herschel's opinion at the commencement of his observations, an opinion warranted by every sweep of the heavens. The powers of his forty-feet reflector, actually did resolve the most of these nebulæ, as was expected, and brought into view others whose light from the regions of remote space, could not be reached by inferior instruments. The views of this truly illustrious man became greatly modified towards the close of his life, and we shall find that this modification was founded on a basis as truly logical as his deductions in the early period of his observations. He was forced to avow his belief in two classes of nebulæ, the resolvable and irresolvable.

Fancy that, with a telescope of moderate power, a nebulous body, pale and indistinct, be discernible in the distant heavens. On the application of increased power, the indistinctness gives place to a well-defined figure, and the paleness of its light is usurped by a general brilliancy, with perhaps here and there a luminous spot, indicating that a little nearer would separate that shining body. Apply now a reflector of great power, and a glittering mass, as it were, of gold dust,—worlds upon worlds heaped,—is scattered on the surface of the background. But during these various observations we have descried new visitors, under-

going in an inferior degree the same changes as we have perceived the first undergoing, and at our last observation we leave them, perhaps, at the secondary stage of advancement;—at that period when they were giving us assured evidence of their true character. What, then, more correctly inductive than all stationary nebulous bodies of amorphous, as well as of distinct character, were stars arranged, not indeed fantastically, but designed to play a part in the harmony of the system to which they belonged—parts of the Universal Unity.

Such were Herschel's first conclusions, and they would undoubtedly have remained unaltered, but for one or two appearances which remained without the scope of his analogy, and which phenomena led him to the necessity of confessing the existence of a nebulous matter in the stellar spaces. Here are his own words: "When I pursued these researches, I was in the situation of a natural philosopher, who follows the various species of animals and insects, from the height of their perfection down to the lowest ebb of life: when, arriving at the vegetable kingdom, he can scarcely point out the precise boundary where the animal ceases and the plant begins, and he may even go so far as not to suspect them essentially different: but recollecting himself, he compares, for instance, one of the human species with a tree, and all doubt on the subject vanishes before him. In the same manner, we pass by gentle steps from a coarse cluster, down through others more remote, and therefore of a finer texture, without any hesitation, till we find ourselves brought to an object, such as the Nebula in Orion, when we are still inclined to remain in our once adopted idea of stars exceedingly remote, and inconceivably crowded, as being the occasion of that remarkable occurrence; it seems, therefore, to require a more dissimilar object to bring us right again. A glance like that of the naturalist, who casts his eye from the perfect vegetable to the perfect animal, is wanting to remove the veil from the minds of astronomers." This similar object was ere long found in "a most singular phenomenon! A star of the eighth magnitude, with a faint luminous atmosphere of a circular form, and about 3′ in diameter. The star is perfectly

in the centre, and the atmosphere so diluted, faint and equal throughout, that there can be no surmise of the existence of stars; for, in the first place, if the nebulosity consists of stars appearing nebulous, because of their distance, which causes them to run into each other, what must be the size of a central body, which at so enormous a distance, so far outshines all the rest? In the next place, if the central sun be no bigger than common, how very small and compressed must be the other luminous points which send us only so faint a light? In the former case, the central body would far exceed what we call a star; and, in the latter, the shining matter about the centre would be too small to come under the designation. Either, then, we have a central body which is not a star, or a star involved in a shining fluid of a nature wholly unknown to us." This was not all, however. The nebula of Orion, a representation of which may be found in the frontispiece, fig. 1, bore hard against the indiscriminate classification of nebulæ. The location of this phenomenon is in the middle part of the Sword, and it is rendered visible by a telescope of ordinary power. "To the naked eye, a dimness of outline is discernible, and the spectator fancies, on the first impulse, that he sees a small star, but closer observation shows him that it is something indefinite and hazy, and having nothing of the appearance of the minute stars." It might with good reason be supposed that a body whose light was thus distinguishable by the naked eye, would have yielded some glimpses of its true character, when examined by Herschel's instrument, since other nebulæ, rendered scarcely visible by telescopes of no mean power, had been easily and distinctly resolved;—but no such satisfactory answer came. There it lay, looming on the dark expanse, of huge and vast dimensions, impenetrable, and unexplored, defying the most wondrous powers of assisted vision. "I know not," says Sir John Herschel, "how to describe it better than by comparing it to a curdling liquid, or a surface strewed over with flocks of wool, or to the breaking up of a mackerel sky, when the clouds of which it consists begin to assume a circous appearance. It is not unlike the mottling of the sun's disk; only,—if I may so express

myself, the grain is much coarser, and the intervals darker! and the flocculi, instead of being generally round, are drawn into little wisps; they present, however, no appearance of being composed of stars, and their aspect is altogether different from that of resolvable nebulæ. In the latter, we fancy by glimpses that we see stars, or that could we strain our sight a little further, we could see them; but the former suggests no idea of stars, but rather of something quite distinct from them." In the girdle of Andromeda, a dim-shining spot is discernible to the eye, but its true character was, alike with that of the nebula in Orion, involved in mystery.

Apart from these appearances, the phenomena of comets present a condition of nebulous matter, entirely different as regards stability, but in many respects apparently similar in constitution. The brightness of these erratic visitors is by no means alike in all, and their density is still more unequal. Here, then, is something positive,—matter of whose composition we know nothing, save that it suffers contraction and expansion, according as it seems to be more or less affected by the sun's rays? Whence and what are they? We cannot tell.

Conjecture admits of many degress of aproximation to truth. It is never equal to positive demonstration. But, it is evident that it may lead into truth, provided that the facts observed, and upon which that conjecture is based, lie in the true path. The cases of Kepler and Newton, are instances in point. Discovery is by no means necessarily inductive. Things hidden to the million are apprehended by genius. It perceives a meaning in things, a language, a connection, to which it endeavors to give an utterance and demonstration by induction. The history of science, in all departments, abounds with discoveries where the thing inferred became so, if we may use a paradox, without the intermediate steps; and still further, the proof, the reasoning, was a retrogression. Into such a region Herschel ventured, and hazarded one of the noblest, the most brilliant of his conjectures. Nothing but the vastness of the study to which his life was devoted, and a familiarity with the noble and majestic views it forces upon the minds of its worship-

pers, combined with an enthusiastic genius, could have led him to his conclusion. From the data, the observations we have enumerated, he framed his hypothesis of the formation of systems. Anything, with the sanction of so distinguished a name, as might be supposed, commanded the attention of his contemporaries, and the respect of astronomers was awarded to his sublime idea, that there existed in the immensity of the heavens, written in every stage of progression, from the rudest chaotic forms to the perfections of suns, systems, and worlds, with all their intricacies of motions and revolutions, and that in the various conditions of irresolvable nebulæ, there existed the strongest evidence of its truth. There was the stronger likelihood of this, since the great majority of nebulæ incline to sphericity, and the all-pervading force of gravity, was evoked to account for such a shape. A speculation like Herschel's has in it much of the force of the sublime to recommend it to enthusiastic minds, still more when it points to an origin, and progressive advancement. Whence and what are these worlds? Did it require ages, not ages such as ours, but cycles of millenary duration, to fit from such rude forms as Orion's nebulæ, by aggregation and attraction of matter, worlds habitable and beautiful as ours? Or was each part of the wondrous whole, an immediate result of the fiat of the Almighty, "He spake, and it was done!" The prevalence of law, constant, and every where acting, has its brightest and firmest proofs in the revelations of astronomy. For the principles of which it treats, are not confined to the planet we inhabit, but controlling the action of atoms and of worlds, model into a globular form the glittering rain-drop, and the mighty sun whose rays it but refracts, and retain in constant and regular motions, planets round their central luminary, suns round other suns, and systems of suns round other systems, all, all revolving round one common centre of attraction, from which emanates that power stretching into space, fully to comprehend which requires *Wisdom Infinite.* Herschel sought for law amid these phenomena, and was satisfied only so far as there existed in his theory, probability. We shall, by and by, see that a distinguished mathematician, and, never excelled, except by one—Newton—had by a different route, and

without a knowledge of Herschel's observations, arrived at conclusions which both added to, and received strength from, Herschel's inferences. That man, immortal in the history of science, was Peter Simon La Place.

Mathematical.

It was remarked in our last number, that Mathematics is the science of quantity; and that it is divided into the three branches of Arithmetic, Geometry, and Analysis. We purpose now to explain the agency which the Mathematics have exerted in enlarging the boundaries of human knowledge—in increasing the power of mind over matter, and in multiplying the comforts and advancing the civilization of man.

That peculiar property of matter by which bodies are mutually drawn to each other by a force which increases as the quantity of matter increases, and as the square of the distance between the bodies decreases, has been found by the aid of Mathematics to be common to all bodies, and is called the *law of gravitation.*

Within the vast expanse of the concave heavens, and at an immeasurable distance from the nearest of the stars, those sentinels of the night, Providence has created and placed a system of bodies, known to us as the Solar System. The glorious sun is the centre of this system, which is composed of nine other principal bodies, called planets, or thirteen in all, if we reckon the five smaller ones which have been recently discovered. Our earth is the third in order from the sun, and its distance from it in round numbers, is ninety-six millions of miles. The diameter of the earth is eight thousand miles, while that of the sun is one hundred and eleven & half times greater, giving to the sun a magnitude five hundred times greater than all the other planets taken together. About the sun, as a centre, all the bodies of the solar system revolve, each being governed in its motions by the general law of gravitation; that is, each body is kept in its orbit by attracting and being attracted by all the others. This power of

attraction, by which matter operates on matter, is the great governing principle of the material world; and since the motion of each body through the heavens depends on the force with which it is attracted by all the others, it is plain that to estimate such a force, varying as it does with the quantity of matter in each, and their distances apart, is no easy problem; yet analysis has solved it, and with so much certainty, that we can mark the precise point in the heavens at which any one of the heavenly bodies will appear at any definite period of future time. Indeed, we may place a telescope, and so direct it, that at the end of any given time, either one of the heavenly bodies shall present itself to the field of view; and if the instrument could remain fixed, though the time were a thousand years, the precise moment, the exact second, would discover the planet to the eye of the beholder, and attest the certainty of science.

A superficial knowledge of the architecture of the heavens would inspire a doubt of the stability of the material system. The mutual action of the bodies on each other, produces what is called an irregularity in their motions. The earth, for example, in her annual course around the sun, is affected by the action of the moon and of all the other planets which compose the solar system, and these attractive forces give an apparent irregularity to its motions. The moon, in her revolutions around the earth, is also influenced by the attraction of all the planets, and yields to each a motion exactly proportionate to the force exerted, and the same is equally true of all the bodies which compose our system. It was reserved for analysis to demonstrate; that every supposed irregularity of motion is but the consequence of a general law—that every change is constancy, and every apparent diversity, uniformity. Was not this a triumph of science? What human knowledge is more precious than that which assures us that our system has not been abandoned to blind chance, but that a superintending Providence is ever exerted through those general laws, which are so minute as to govern the motions of a feather, as it is wafted along on the passing breeze, and yet so omnipotent as to preserve the stability of worlds. But analysis goes yet another step. That

class of wandering bodies, known to us under the name of comets, and which occasionally visit the range of our vision, although apparently escaped from their own spheres, and straying heedlessly through illimitable space, have been pursued by the telescope of the observer, until sufficient data have been obtained to apply the process of analysis. This done, a few lines written on paper reveal their orbits, and indicate the precise times of their re-appearance. These results, when first obtained, were so striking and apparently so far beyond the reach of even science itself, as almost to need the verification of actual experience. At the appointed times, however, the comets re-appear, and science is thus verified by observation.

A most remarkable application of mathematical science has recently been made by the distinguished French mathematician and astronomer, Le Verrier.

Until the year 1781, Saturn was supposed to be the remotest planet of the solar system. Its distance from the sun is 909 millions of miles, or about ten times greater than the distance of the earth. On the 13th of March of that year, Sir Wm. Herschel discovered the planet which for a long time bore his name, but which is now called Uranus. The distance of this planet from the sun is 1,828 millions of miles, or twenty times greater than the distance from the sun to the earth. Once in eighty-four years this planet describes his circle round the sun, the radius of which is 1,828 millions of miles, and the circumference of which has long been supposed to limit the space occupied by the solar system. But the eye of science, which never sleeps, has been applied to the telescope of the astronomer, and watched for years the motions of the distant planet. It was soon observed that they were irregular, and doubts were expressed whether the law of gravitation operated with certainty at so great a distance. The results of these observations met the eye of a student at Paris. He read in the scientific journals, that the planet Uranus, wandering through space, at a distance of 1,828 million of miles from the sun had, at certain period of its orbit, departed from the path which science had assigned to it. His discerning mind at once

perceived that there was a cause, and that that cause must be the presence of a neighboring planet yet unknown; for the disturbing influences of all the known ones had already been calculated. He does not run to the observatory, seize a telescope, and explore the heavens, to discover, by experiment or chance, the magnitude and position of the disturbing force. He retires to his study, and there compares the data afforded by the observations of others, and at the sitting of the Academy of Science, in June last, he proposed the following enquiry: "Is it possible that the irregularities in the motions of Uranus are due to the action of a planet situated in the ecliptic, at a mean distance from the sun double that of Uranus? And if this be so, where is the actual place of this planet? What is its magnitude? And in what time does it perform its revolution about the sun? This problem he has since solved.

He has clearly proved that the disturbing force, which caused Uranus to swerve in his orbit, as he circles the heavens once in eighty-four years, was an unowned, because unknown member of that family of bodies which constitute our solar system. He also proved that its distance from the sun is about 3,600 millions of miles, or nearly twice the distance of Uranus, and that it revolves about the Sun in about 217 years. Yes! the bold and fervid mind of Le Verrier, which first conceived the idea that the disturbing force which shook a world in its revolutions, might, by the aid of science, be located in space, has accomplished that wonderful result. A few marks made upon paper, in his study at Paris, discovered that hidden cause whose effects had long baffled the investigations of philosophy. Thus, a new world was brought within the sphere of human knowledge—not by chance—not by vague hypothesis—but as the child of science.

Having completed his calculations, he wrote to M. Galle, of the Royal Observatory of Berlin, that if, at a certain time, he would turn his telescope to a point in the heavens, which he indicated, a new planet would present itself to his view. At the exact moment, and at the very place named, the eye of man

beheld, for the first time, that distant world, which almost seems to divide the solar and stellary systems, and which has given immortality to the name of Le Verrier.

It may not be out of place here, to remark, that the late Professor Bode, of Berlin, discovered a law by which the distances of all the planets from the sun is regulated. That law is now called Bode's law of distances. It, of course, corresponds with observation and measurements before and since made. The numerical results of this law are found in most of the works on Astronomy, and need not be here recapitulated. The law is nearly this. The distance of the several planets, reckoning from the sun, is nearly doubly the distance of the first; that of the third, at nearly double the distance of the second; and so on, till we reach the outer planets, where the distances double as we proceed from one to the other. To this law the distance between Mars and Jupiter does not correspond; and Bode suggested the idea of another planet revolving between these two. Since that time, there have been discovered within that space, the five small planets, or asteroids, Juno, Vesta, Ceres, Pallas and Astrea, whose common centre of gravity occupies that space in the heavens which the law of Bode assigned to an unknown planet, and whose existence was necessary to render his law of universal application. These, at one time, doubtless formed a common planet, which was rent asunder by some convulsion of nature.

We have thus far alluded only to the higher applications of mathematical science, but there are others, perhaps, of greater practical utility. It is certainly well to enquire, whether the gratification of our love of knowledge, and the improvement of our minds by examining the complex machinery of the universe, are the only objects to be attained by the study of the Mathematics? Are the little figures, the lines, the angles and the equations, over which the mathematician ponders with so much delight, pregnant with no practical good to mankind? Do they aid labor? Do they increase our power over matter? Do they, indeed, contain anything that is practically useful? These are questions of the first importance, and especially in a country like

ours, where the foundations of national education are about to be laid broad and deep. Let us enquire, then, if these unyielding, uncompromising mathematics can be called the useful as well as the exact sciences.

The value of Arithmetic is conceded, but Geometry—is that necessary? Is it indispensable that we should know anything of lines, angles, surfaces, and solids? The very apartments we occupy, which protect us from the inclemency of the weather, could never have been constructed without the aid of Geometry. The carpenter could not calculate the length of his rafter, without knowing the relation between the hypotenuse and the two sides of the right angled triangle. The bridges which span our rivers, could never have been so constructed, as to resist the floods and elements, but for the borrowed light of Geometry. The mechanic cannot do without it. The millwright applies it in adjusting the driving to the driven wheel, and in fastening the cogs, so that they will lock into each other. In short, the mechanic arts of construction rest upon it as a permanent basis.

But the third branch of the exact sciences—Anal ysis—may not that be dispensed with? Can we not, at least, get rid of those signs and symbols, which inspire so much terror? Must the plus and minus signs, the square and cube roots, and those troublesome experiments be strung through the brain like a spider web? Would you calculate the power of the steam engine, and adjust the strength of every part, to the resistance it is to overcome? Would you apply power economically in a manufacturing establishment? Would you grade the railroad to the most advantageous angle, so as to secure the greatest speed compatible with safety, with the smallest expenditure of force? If you would do these things, you must have recourse to Analysis.

Passing from the practical benefits, which flow from the pursuit of the exact sciences, we come to the last division of the subject, viz: to speak of the pleasure and gratification which this study affords.

Placing, as we certainly do, a high value on the acquisition of these sciences, as a means of mental improvement, and seeing

constantly before our eyes the blessings they have scattered through every department of industry and labor, we would not, on that account, undervalue other and kindred branches of knowledge. All branches of knowledge are more or less intimately connected. Together they form a perfect whole—one golden chain encircles them. Like the bodies which compose the system of the universe, each acts upon the other, communicating and receiving a mutual influence. The lights of knowledge, like those of the firmament, shine with different intensities, but we would not on that account, exclude a single ray; who would extinguish the smallest star that sparkles in the host of heaven? All the blended colors of the rainbow, are necessary to form the perfect light of day; so all the varied lights of knowledge, are required for the perfect illumination of the mind. But is there really any pleasure in studying the exact sciences? The very name of mathematics, to some, is appalling; yet their study develops and gives strength to the mental powers.

What are the faculties which it is the object of education to unfold and improve. Memory, combination, comparison and judgment. Now to establish a single mathematical proposition, all the previous principles must be accurately remembered, carefully compared and combined, and the judgment which deduces the consequences, must be unerring. Hence we see, that mathematical reasoning strengthens and invigorates the mind, gives it accuracy and power, excites it to new combinations, and leads it in the pathway of rational development.

The exact sciences carry forward the mind in the precise order in which its faculties are developed, in our progress from childhood to age. After the idea of color, which is merely an impression, the child acquires the idea of form. He distinguishes the straight from the crooked stick, the round from the square corner, and will understand the terms large and small, when applied to the cake which he receives from his indulgent mother. He begins early to count his playthings, and arranges them in little piles, which he numbers accurately. He has thus acquired clear ideas of number, form and extension, and these form the basis of all

mathematical reasoning. At a maturer age, he begins to reflect on what he observes around him, and his mind impelled by one of its primary laws, seeks the reasons of things. No longer satisfied with facts, he aspires to causes. Here the process of analogy commences, and with it the higher developments of his intellectual nature.

Mathematics, therefore, conform strictly to the order of things established by Divine Providence. They give no precocious growth to the intellect, but conduct it forward with a steady and certain step. They do not feed the imagination with the enchanting visions of fancy, nor tempt reason from her throne of truth.

There is that within us, which delights in certainty. The mists of doubt obscure the mental, as the mists of the morning do the natural vision. We love to look through the transparent medium of truth, and to see every object in its exact proportions.

Mathematics are the pole star, towards which the mind is directed with the same unerring confidence with which the soul is lifted to the throne of its Creator.

Are there any motives for the study of the exact sciences? Would you open the great book of nature, and read the lessons of wisdom, which Providence has scattered through all his works? The exact sciences are the alphabet of that book. You cannot read even the title page without them. Would you understand the law of gravitation—that great law, by whose unerring rule the whole physical universe, in all its motions through space, fulfils the intentions of the Omnipotent? You cannot prove its existence as a general principle, without the aid of mathematics. Would you learn the properties of the air we breathe; its elasticity producing sound, its refractive powers, which scatter the rays of the sun over the eastern sky, ere yet he reaches the horizon, and which at evening gilds the western heavens with the mellow tints of twilight? Would you ascertain its weight, and its capability of compression and expansion? These you cannot know, without the aid of the exact sciences. You may indeed take the results from others, you may learn the facts; but the reasons, the causes, the philosophy are only to be approached through the pathway of science.

Would you study Chemistry? Would you decompose the known substances, and search for the elements of matter? You will find them united in fixed proportions. The gases, which by their union form the atmosphere, will only unite in the ratio established by nature herself, and these ratios can only be established by the aid of mathematics. If you look into mineralogy, you will find that every crystal is a geometrical figure, and here even science sparkles as the diamond.

The great temple of nature, is only to be opened by the keys of science. We may perhaps reach the vestibule, and gaze with wonder on its exact proportions and gorgeous exterior, but we cannot open the portal and explore all its apartments, unless we use appointed means.

The precious metals are not scattered profusely on the surface of the earth; they are for wise purposes buried in its bosom, and can only be disinterred by toil and labor. So with knowledge; it comes not by inspiration; it is not borne to us on the wings of the wind; it cannot be extorted by the power of a Cæsar, or purchased by the wealth of a Crœsus; but it is the sure and certain reward of diligent and assiduous labor. Is it worth that labor? Oh! what is it not worth? It has perforated the earth, and she has yielded up her treasures. It has guided in safety the bark of commerce over distant oceans, and brought to civilized man, the treasures and choicest productions of the remotest climes. It has scaled the heavens, and revealed the hidden laws which govern and regulate the material universe. It has pushed its inquiries into the regions of space, where it was supposed that the mind of the Omnipotent never yet energized, and there located unknown worlds; calculated their distances from other planets; their magnitudes; the lengths of their seasons; their days and nights; and not only fixed their places in the heavens at the moment of discovery, but at the expiration of any given period of future time.

Yea, it has done more than this; it has caused arrogant, presumptuous, and erring man, to look up with humility and awe through this wonderful manifestation of wisdom, to that omnipotent and divine power which has created, which governs and sustains all things.

Geographical.

Geographical maps come properly under the head of mathematical geography. They are either *geographic* or *hydrographic*, as they delineate and represent land or water; but when water is the field, they are usually called charts. Whether the extent of surface represented be large or small, nothing can supply the place of good maps. They are visible representations of extended portions of the earth's surface, which cannot be so well presented in all their relative bearings to the eye and understanding by words.

The maps of the ancients were deficient and inaccurate, both as it regards the methods of projection, and the limited extent of country, which was with them best known. Great improvements have, however, been made by the moderns in the knowledge of countries, as well as in their methods of delineating them. The higher mathematics, and the differential and integral calculus, have been brought into requisition, and made applicable to the development of the principles of mapping. Authors have divided the subject, and suggested and used several kinds of projection, each of which is thought to possess some peculiar merit. A tasteful drawer, who has an accurate eye and delicate hand, will often execute a beautiful map, as may be seen by looking into many of our schools, without much acquaintance with the true principles of projection. There are two methods, among the many that have been proposed for spherical projection, that are essentially scientific; viz: the orthographic and the stereographic. These have undergone many mutations, and have been presented to the schools under sundry methods of development, by such men as Mayer, Puissant, Euler, Lagrange, Mercator, Delisle and Flamstead. The figure of the earth renders it impossible to represent on a plane, the relative extent of regions and distances of the places with exactness. The covering of a sphere cannot be spread upon a plane, without rending, stretching, or doubling some parts of it. Hence it is not possible, that a strictly spherical development can be put upon a plane.

But there are *developable* curved surfaces, such as the covering of a cone or cylinder. In the cone, which may be supposed to represent a hemisphere, the diagram formed by the equator and two meridians, is an isoseles triangle; in the case of the cylinder it will be a parellelogram. Both of these methods have defects to be obviated. The principle of perspective upon which the orthographic projection is founded, seems to be, that the eye is presupposed at an infinite distance, so as that the rays should fall parallel upon the earth, and take in half its surface.

The stereographic projection is that where the surface of the sphere is represented on the plane of one of its great circles, as the equator, the eye being placed at the pole. This projection was not known in ancient times. The first maps on this plan were by Werner, in the sixteenth century. It was not applied to maps of moderate extent of country, until about 1720. About this time, it having undergone several modifications, was adopted in a geographical work by Heseus, also a German. This method, though favorable to accuracy in detail, is pretty nearly superseded by the best geographers, by the stereographic method.

There is another scientific mode of projection, called central, because the perspective is such that the eye is supposed at the centre, and the map produced on this plan would be a plane, tangent to the sphere. This is the method of Mercator's chart, in which the meridians are equidistant, parallel straight lines.

The laws of the orthographic projection, as given by Malte Brun, are these :

1st. The rays by which the eye sees at an infinite distance, are parallel.

2nd. A right line, perpendicular to the plane of projection, is projected through a single point.

3d. A right line which is not perpendicular to the plane of projection, but parallel or oblique to it, is projected by a straight line, terminated by perpendiculars brought on the plane of its extremities.

4th. The projection of the line is greatest possible, when it is parallel to the plane of projection.

But elementary maps in schools, as usually constructed, do not require much mathematical knowledge, because they are not from astronomical observations, nor from geodesical surveys. The process of ascertaining the latitudes and longitudes, or of determining by the compass and the chain, the bearings and the distances, do not form a part of the work of the copyist. The trigonometrical process of triangulation, from determinate positions, does not form a part of his work. It requires rather skill at manipulation than scientific knowledge. Common geographical maps, are rather intended to present the general features and outlines of a country, than specific and accurate details; and are frequently better calculated for elementary instruction, when they have but few names on them, than those compounds of charts and maps, that are encumbered with numbers, symbols and names. Maps are usually made to exhibit the most remarkable features of a country, but it is next to impossible to condense the details of every subject connected with a given country, upon the same map. One is intended to shew the extent and political limits of a state, with its cities, towns, counties, and capitals. Another is designed to shew the physical character of a country, its mountains, rivers, shores, valleys, deserts, mines, &c. Another is for military or commercial purposes, shewing the impregnable and vulnerable positions, the roads, the passes of mountains, the fordable and bridged places of rivers, and the staples and places that excite and sustain trade and commercial enterprise.

Another is for nautical purposes, and should have marked upon it the shores, and the head lands, the shoals, the reefs, the small islands, the courses of currents and the trade winds. Again, there are maps shewing the character of the natural history of a country, its geology, its botany, its zoology. Also maps of history, shewing the migrations of the founders of nations, the places of settlement, the voyages of navigators and their discoveries. Maps of all these descriptions, are desirable and useful in the promotion of the interests of public instruction. The great thing to be obtained in an atlas for schools, is not to display every conceivable detail, but to set forth the great and prominent features of the country they represent.

The reader will bear in mind, that we have treated of the construction of maps, according to some approved scientific projection; such as are suited to the most accurate delineation of large tracts of country. The original elements upon which every such map is made, are astronomical observations, trigonometrical surveys, itinerary distances. But it is not often that the geographer has all these data in perfection. General outlines are easily obtained, at this day, of most countries; but entire accuracy is hardly to be expected, without the data before-mentioned. And as it regards astronomical observations, which rank first in these elementary particulars, they can seldom be got in new or remote countries, whose accuracy can be implicitly relied on.

Effects of Temperature.

It is an interesting subject to observe and illustrate the influence of temperature upon the works of nature and art. For this purpose, the following extract from a table prepared by a learned friend, Thomas Fisher, of Philadelphia, is perhaps as good as can well be found. Professor Farraday, availing himself of the intense cold produced by evaporation of the mixture of solid carbonic acid and ether, under an exhausted receiver of an air pump, and assisted by a pressure equal to fifty atmospheres, has produced the greatest degree of cold yet known to chemists—viz: 166° of Fahrenheit below zero.

146 Degree of cold below zero, produced by Dr. J. K. Mitchell, of Philadelphia—alcohol becomes syrup.

103 Ammonia becomes a transparent solid of greater specific gravity than when liquid.—Farraday.

90 Greatest artificial cold produced by Mr. Walker of Liverpool.

78 Cold produced by mixing sulphuric acid and snow.

70 Natural temperature observed by Capt. Back, at Fort Reliance, north lat. 62° 46', lon. 109° west.

65 4 parts alcohol, 1 water became viscid—2 parts, 1 water, froze into ice.

58 Estimated temperature of planetary space—Fourier.
57 Pyroligenous acid freezes.
55 Lowest degree registered by the thermometer of Capt. Sabine, during the winter of 1819, spent at Winter Harbor, Melville Island, north lat. 74° 47′ lon. 110° 48 west. The mean temperature for six months, from November to April, inclusive, was 21¾ below zero.
55 Strong nitric acid freezes.
50 Natural temperature observed by Mr. Hutchins at Hudson's Bay.
46 Ether and liquid ammonia freeze.
45 Nitric acid freezes.—Cavendish.
39 Mercury freezes. Melting point of quicksilver.
36 Sulphuric acid freezes.—Thompson.
17 Creosote fluid.
11 2 parts alcohol, 1 part water, freeze.
7 ½ alcohol, ½ water, i. e. brandy, freezes.
3 Is the mean temperature of the coldest day ever known in the vicinity of Philadelphia.
Zero is nearly the greatest extreme of cold known at Philadelphia. Equal portions of snow and salt produce zero.
+7 1 part alcohol, 3 parts water, freezes.
16 Spirit of turpentine freezes.
20 The strongest kinds of wine freeze.
23 Hydro-fluoric acid freezes.
23 Coldest monthly mean temperature known for many years at Philadelphia.
25 Human blood freezes.
28 Vinegar freezes.
30 Milk freezes.
32 Freezing Point of Water. Ice melts.
36 Olive oil freezes.
40 Vegetable life awakens in the Spring, is suspended in the autumn. From 40 to 140 comprises the range of vegetable temperatures.
52 Mean annual temperature at Philadelphia. Monthly tem-

perature of April and October, and of water in wells, at Philadelphia.

59 Vinous fermentation commences. All vegetable processes in art, brewers, bakers, all decomposition and reorganization in Nature commence.

62 Is the temperature which is most suitable for churning butter of the best quality.

62 The favorite or most proper temperature of apartments.—Dr. Cullen.

68 The most proper temperature of apartments.—Dr. Physick.

70 Best point of temperature for Brewers, and fermentation of bread.

76 Mean annual temperature at the Tropics.

77 Vinous fermentation is rapid. Vegetation and vegetable decomposition rapid. Acetous fermentation begins.

80 Greatest monthly mean temperature ever known at Philadelphia. This was July, in the hot and dry summer of 1838. It is stated that the yellow fever has never occurred at Philadelphia, unless after a continuous average heat of 79½° for three weeks. This degree of heat is esteemed necessary to its production, and occurs only in seasons of great drought and heat.

88 Acetification ceases. According to other authorities it is said to continue seven degrees higher, up to 95.

88 Mean annual temperature at the Equator.

96 to 100 Animal temperature in all climates. Warm blooded animals coldest temperature 70, warmest, 112.

97 Lard melts.

98 Ether boils.

100 Phosphorus melts.

112 Fever heat. This temperature (of the body,) produces death in all the warm-blooded animals.

112 Spermaceti melts.

120 Heat of the Summer sun's light at Philadelphia.

120 Oxidation of lead. White lead works.

120 Bleaching temperatures commence, terminating at 212.

122 Phosphorus burns.

124 to 126 Greatest heat at which De La Roche and Berger existed for a few minutes in watery vapor.

127 Tallow melts.

140 Liquid ammonia boils.

140 Greatest heat of the vertical sunlight on the Equator. This temperature is the greatest natural atmospheric temperature which exists, and, when they are fully exposed to it, is sufficient to cause the death of all animals in a comparatively short time.

145 Camphor sublimes.

145 Ambergris melts.

165 Albumen coagulates--eggs are cooked.

170 Sulphur evaporates.

176 Alcohol boils.

201 Rose's Metal melts. 8 parts bismuth, 5 parts lead, 3 parts tin.

211 Newton's metal melts. 4 parts bismuth, 2 parts lead, 3 parts tin.

210 Young man remained in a stove for twenty minutes.—Dobson's Experiments, Liverpool.

212 Water boils, and watery compounds boil. As a general rule the dissolving of any thing in water increases the temperature required to produce boiling.

218 Water saturated with salt boils.

226 Sulphur melts.

230 Saturated solution of muriate of lime, (chloride of calcium,) boils.

230 Water saturated with sugar—syrup of sugar boils.

242 Nitric acid boils.

240 to 260 Dr. Blagden at Liverpool sustained this temperature eight minutes.

264 A baker's daughter is said to have remained in an oven, thus heated, for twelve minutes.—Tillet and Duhamel, 1760.

Camphor melts, and boils at 400.—Turner.

300 The surfaces of all furnaces, whether of iron, brick, or other material, designed for heating air for warming

rooms, should never exceed this degree. Where they do, the purity and salubrity of the air is sensibly and seriously affected, a peculiar "baked" odor is imparted to it, so often the case in public assemblies, churches and private dwellings. To obviate this, furnaces or stoves should be of large size in proportion to the rooms to be warmed, a large quantity of air should be admitted in proportion to the fuel consumed, which will of course be the means of a more equable and moderate heat, and better ventilation.

303 Sulphur burns slowly. Heat of baking ovens may be readily determined by the ignition of sulphur.

320 Volatile oils boil generally as high as 320, many of them 100 degrees higher.

300 to 350 comprise the temperatures proper for baking vegetable substances—bread, pies, meat, fruits, &c. The heat of a baking oven may, with a little practice, be excellently well determined by the quick or slow ignition of a sulphur match tied to a stick and held in the centre of the oven.

397 Creosote boils.

442 Tin melts, most easily of the metals.

460 The surface of polished steel acquires a pale straw color, and takes a slight degree of "temper" when suddenly chilled.

476 Bismuth melts.

554 Phosphorus boils.

560 Spirit of turpentine boils.

570 Sulphur boils.

580 The surface of polished steel acquires an uniform deep blue color, and when suddenly chilled, takes a high "temper."

590 Sulphuric acid boils.

600 Linseed oil boils.

612 Lead melts.

635 Iron begins to show light of ignition in the dark.

660 Mercury boils.

680 Zinc melts.

752 Iron bright red in the dark.
800 Hydrogen burns.
802 Charcoal burns.
809 Antimony melts.
884 Iron red hot in twilight.
980 Iron red heat—Daniel.
1077 Iron visibly red in daylight—Wedgwood.
1141 Heat of a common parlor fire—Daniel.
1207 Iron blood red in daylight—Wedgwood.
1257 Heat of an enamelling furnace.
2897 The diamond burns.
3807 Brass melts, $\frac{2}{3}$ copper, $\frac{1}{3}$ zinc.
4587 Copper melts.
4717 Silver melts.
5247 Gold melts.

For the higher furnace temperatures, we can offer no measurement but those of Wedgwood's pyrometer, which is admitted to be far from a satisfactory one. A good pyrometer is a great desideratum in science.

8487 Working heat of plate glass.
10177 Flint glass furnace lowest heat.
11737 Carbonization of iron—steel manufacture.
12257 Liverpool ware baked.
12777 Lowest welding heat of iron.
13427 Greatest welding heat of iron.
13297 to 15637 Common sorts of China ware and porcelain vitrified.
15897 Flint glass furnace strongest heat.
17327 Greatest heat of a common smith's forge.
17977 Cobalt melts.
20577 Nickel melts.

Hessian crucible fused.

21637 Iron melts.
21876 Manganese melts.

Best Chinese porcelain softened.
Nankin porcelain not softened.

23177 Platinum, molydena, tungsten, and the more refractory of the metals, melt.

Titanium most difficult to melt.

25127 Greatest heat observed.

The above table presents a scale of temperatures designed to show the control of temperature over the phenomena of nature and of art, in their widest range, from the solidification of the gases, the freezing of mercury and water, to those delicate temperatures necessary to vegetable and animal life, existing on the landscape of Nature; and thence to those of the bleaching, boiling and baking temperatures, and the furnace heats, from the melting of tin and lead, to those of the carbonization and welding heats of iron, and the melting of the metals most difficult of fusion.

Persons who have not given attention to the subject, have no idea of the importance of certain precise temperatures to the best performance of many processes in the useful arts. A variation of five degrees will often not only render an operation ineffective, but partially or entirely destroy the materials employed. Certain temperatures are doubtless, in like manner, essential to all natural phenomena.

Notices of Books.

A Universal and Critical Dictionary of the English Language, by Joseph E. Worcester. Boston: Wilkins, Carter & Co.

At any time during the last age, while the success of the governmental experiment of these United States was yet a problem; when as yet no scholars had arisen among us whose fame had reached Europe; when the provoking inquiry was so often put, "Who reads an American book?" any one in these States who should have proposed to write a new Dictionary of the English Language, would have received the jeers and the rebukes of the British literati and the reviewers. We were then a nation

in the *gristle*, or perhaps I might say, in our adolescence, and ought to remain some time longer at Jericho, before adventuring upon a business requiring maturity of scholarship. It was admitted that democratic principles and institutions, with their strong tendencies to equality, might elevate the low, but they would depress the high, and that such a constitution of government as we had adopted was unfavorable to eminent scholarship. Although it was conceded by some English statesmen, that our country, during the war of the Revolution, had sent forth some well-drawn state papers, yet it was not to be expected of her, that she had either a literature, or distinguished scholars of her own. It would at that time have been thought most consummate arrogance for an American to have proposed to amplify or enrich the lexicography of the language. Besides, there were provincialisms obtaining amongst us, and there was a constant divergency from the pure line of "English undefiled," on both sides of the water; and all history shewed that if America ever created a literature of her own, and assumed the responsibilities of authorship, especially in philology, we should soon speak and write in the United States and in Great Britain, two cognate languages, differing probably as much as those of Portugal and Spain. Nor were the fears of the English philologists at that time entirely groundless. New coinages in this country were not infrequent; and English authors and critics, having assumed, as if by a sort of prescriptive right, the maternity of our tongue, they were almost, as a matter of course, adjudged to be the legitimate guardians of its purity. Besides, the United States, by their own overt acts, having voluntarily excluded themselves from the enjoyment of any relationship to the high prerogatives of royalty, it was but a reasonable retaliation that they should be excluded from the republic of letters.

Prejudice abroad against American authors, and a high veneration for the productions of the Augustan age of English literature among ourselves, operated to retard and discourage literary pursuits in this country. Bookmaking was not yet a trade, and nothing pretending to be a dictionary of the language appeared

until 1806. During that year the Compendious Dictionary, by Noah Webster, appeared. Mr. Webster had contended for progressive improvement in language, and justified, by his vaticinations in his preface of this Dictionary, the divergency before spoken of; yet he seems to have considered himself in advance of the age, and did not attempt to carry out all the innovations which he proposed. His good sense brought him to the conclusion, that "no great changes should be made at once." In 1813 a large "Dictionary of the English Language, by an American gentleman," of considerable pretensions, was published, in which is contained a number of technical words connected with the professions and the arts. Many new words, then just coming into use, were inserted in this Dictionary. Although this work showed the defects of previous authors on this subject, and made some steps of advancement, yet there was a want of plan and arrangement that left room for further improvement. In 1807, I believe, Mr. Webster published an enlarged edition of his Dictionary.

In 1828, Joseph E. Worcester brought out an edition of Johnson's Dictionary, with Todd's additions, and Walker's pronunciation. This is said to contain 15,000 words more than are to be found in Johnson's abridgement, and was an evident advance in English lexicography. In the course of a few months after this, appeared the great Dictionary of Noah Webster, LL. D., in two quarto volumes, in which profound etymological research is evinced, and the vocabulary is much increased. Mr. Webster informs us, that the Dictionary of Walker contains thirty-eight thousand words; Johnson, Sheridan, Jones and Perry, have each about the same. That the American edition of Todd's Johnson, contains fifty-eight thousand, and that this new Dictionary, (Webster's,) has seventy thousand.

It may surprise some to be informed, that our record of English words should have been nearly doubled in a few years. If the process of enlargement is not understood, the announcement of such an increase of words would appear to interpose a formidable obstacle to the acquisition of the language; but, on an

inspection, it will be found that not many new radicals are introduced. This power of expansion is inherent in the analogical principles of construction.

The radical word, for instance, is a noun, but its variations may run almost through the parts of speech. The word *diction* has the following: dictionary, dictionarian, dictate, dictation, dictator, dictatrix, dictatorship, dictatorial, addict, addicted, benedict, benediction, benedictive, contradict, contradiction, edict, indicate, indication, indicative, indict, indictable, indiction, interdict, maledict, malediction, predict, prediction, predicate, predicable, predictive, predictively, verdict, &c. &c.

And this expansive power may be reduplicated by compounding them with other words, or with proper names, so that it is really no marvel that a careful compiler may always be finding new words wherewith to enlarge his vocabulary. Another source of increase of words is to be found in the improvements in the arts, in new scientific discoveries, and in increased commercial intercourse with other countries. Writers of works of taste and elegant literature, have also, for years, been engaged in the rather odious business of naturalizing foreign words, to the no small scandal and disparagement of our own, ofttimes better, Anglo-Saxon.

They who supposed that Dr. Johnson and his compeers had fixed the standard, were sadly annoyed and disappointed to be told that this process of innovation and adoption was the process upon which the English language was formed. This illimitable increase, from various foreign resources, is both perplexing and discouraging to the mere English scholar, inasmuch as he can never gain the mastery of what he would fain call his mother tongue.

"The German language, (said the late learned professor Follen,) is distinguished by the copiousness of its vocabulary, and its power of indefinite increase from its own stock. This arises from its being an original language, not made up, like the English, of a motley mixture of Greek, Latin and French, with Teutonic; but Teutonic throughout. A German compounds new terms

almost *ad libitum;* and these compounds, being drawn from a stock of words already familiar to the people, are immediately understood by all, and therefore, if expressive, are easily admitted into use. Hence the German has words for the most various shades of ideas, for many of which the English affords no corresponding terms."

If we wish to form a new term in science or philosophy, we run to the Greek. But, as words of such an origin are necessarily unintelligible to the great body of the people, they make their way into use very slowly, and few of them obtain currency. Hence the comparative poverty of the English tongue in terms expressive of the classification of sciences, or of shades of thoughts and feelings, and hence one of the difficulties of clothing in an English dress, the German systems of intellectual philosophy. The progressive process in language to which we have so long had recourse, in order to suit our terms and expressions to every coming exigence, has induced a habit, and perhaps a necessity, for its continuance. Other causes will unquestionably appear, requiring new terms to express them.

The nomenclatures of science and the arts are constantly enlarging, and in this way the Greek and foreign elements have been much increased within the last thirty years. The increase of the language by the adoption of such words as are necessary to accommodate it to the present state of the sciences, and to express with definiteness the nice distinctions in mental philosophy, is, beyond controversy, a great improvement in the language, which is demanded by the spirit of the age. Very many words answering these ends, which have been brought into use within the last twenty or thirty years, are found in this Dictionary properly defined, and pronounced according to the principles laid down in Walker. These additions we consider one of the chief improvements which may be justly claimed for the *Universal and Critical Dictionary.*

Mere multiplication, by bringing in synonymes of words already in use, or the changing of the spelling or formation of words whose established meaning is universally understood, cannot be too severely reprehended.

We are pleased to see that Mr. Worcester has taken this view of the subject. The words systematize, dogmatize, anathematize, and stigmatize, do not admit of a change of formation, so as to be written *systemize, dogmize,* &c. Words of this formation require that the Greek etymon, in its integrity, be retained in the derivatives. Who would like to see the derivation changed, and written systemize, systemic, systemical, &c.?

A few years ago, the British critics condemned the *use* of the following words as *verbs:* advocate, base, bottom, found, immigrate, progress, test, grade, expatriate, locate, and veto; but it is believed they are now in respectable use. The following are occasionally used in this country as verbs, but have not been received in England, and are yet avoided by the best writers here: approbate, eventuate, jeopardize, perilize, and others like them. It is a general rule, which need not be disturbed, that verbal terminations, such as *ate* and *ize,* should not be suffixed to words already verbs.

A change of the government or institutions of a country will almost, as a matter of course, bring neologisms into the language. Hence we have in common use such words as president, congress, gubernatorial, caucus, electioneering, senators, &c., while the English use with equal familiarity parliament, lords, commons, assize, dean, prebend, chartism, hustings, &c., words not much used or needed here. In the *Universal and Critical Dictionary* both the particular and general definitions of this class, are accurately given. Words that have suffered by decay and unpopularity, are not hastily pronounced obsolete, nor have words of doubtful legitimacy been hastily admitted; where, however, such words have found favor with respectable writers, Mr. W. has received them as probationers, marked them with an asterisk, and given something of their character and pedigree.

This Dictionary is said to contain 85,000 words, being 27,000 more than are in Todd's Johnson, and a large number more than are in Webster's great quarto. It is also rich in matter beyond its full vocabulary, having in its well-written introduction discussed,

1st. The principles of pronunciation, sound of the vowels, diphthongs, consonants, accent, and orthoepy.

2d. Remarks on orthography, with a list of words which are of doubtful, or of variable orthography.

3d. A concise English grammar.

4th. Origin, formation, and etymology of the English language.

5th. A chapter of archaisms, provincialisms, and Americanisms.

6th. A history of English lexicography, and a catalogue of English dictionaries.

To the work is appended Walker's Key to the Pronunciation of Greek, Latin, and Scripture proper names, and observations on Greek and Latin accent and quantity.

Notwithstanding the unwearied and important researches of Richardson, and our learned countryman, N. Webster, LL.D. and others, by which many dubious etymologies have been settled, and many floating and hitherto unauthorized words have been sanctioned and fully adopted, as component parts of our language, there was yet room for improvement in our lexicography, as has been, we think, abundantly shewn in the production of *A Universal and Critical Dictionary of the English Language, by Joseph E. Worcester.*

American Review.—This periodical for March, aside from several ably written political articles, has one on the Destiny of the Country; Letters on the Iroquois; Sketch of John Hampden Pleasant, and his Times; Landscape Gardening; Thoughts on the Run, &c.—This work is edited and published by G. H. Colton, 118 Nassau-street, and contains a great deal of well-written matter, suited to the general reader, and it presents strong claims upon those who have embraced the Whig creed in politics.

New School Books.—William Russell and John Goldsbury.—Published by Charles Tappan, 114 Washington-street, Boston.—We have just been looking over these spelling and reading-books. They constitute a series, commencing with the simplest and easiest lessons, and going up in a consecutive gradation of very tastefully selected extracts, from various sources, to the management of those modulations and intonations which are the charm of good reading. We have not, in general, been favorable to complex

mechanism, and many artistical appliances for the regulation of utterance, that should be done with a freedom and simplicity that are according to grace and nature. "If there could spring up," says Dr. Porter, "a supply of teachers, competent as living models to regulate the tones of boys in the forming age, nothing more would be needed." But as we must wait, even in this day of progress, sometime yet for such a consummation, we would recommend teachers to look into this series, wherein they will find many excerpts that are beautiful, and many suggestions and directions that will be useful.

Exercises in Parsing, by T. Rickard, A. M., and H. Orcutt, A. M. Published by R. S. Davis. Boston. 1847.—This is a cheap little book, of 98 pages, of judicious extracts from the poets, the lines being numbered, as they should be, for such purpose. It opens with four ingenious tables, suggestive of method in classification, or inflections in etymological and syntactical parsing, and in analysis.

Parker's Geographical Questions: Harper & Brothers, 82 Cliff street.—This is a neat little volume, of sixty pages, which by means of a process of classification, has simplified the teaching of Geography. From the examination which we have bestowed upon it, we should think it an excellent aid to the teacher. It seems to have a primary reference to Morse's Geography, but it will answer very well for exercises on any other good Atlas. We have also another book from the same author, and the same publishers, viz: *Aids to English Composition, 5th Edition.* This work, we believe, is generally known to teachers, who have occasion to use a work of this description. If it is not, it ought to be.

From the Self-Instructor.

Knowledge of the Earth.

Lord Brougham once remarked, that if we were deprived of what we learn during the three first years of our lives, we should be the most ignorant beings on the face of the globe. The learning referred to in this remark, is evidently science, acquired by *self-instruction.*—A knowledge of the productions of nature, and of the laws which govern them, obtained by direct observation and diversified experiments—by self-moved, self-impelled, delightful and almost ceaseless efforts, on the part of the young and self-taught pupil.

Geography, Geology and Geometry, furnish interesting lessons for substantial instruction to every child before he is a year old. From a field, garden, yea, or even the nursery, with a stream, glass or drop of water, are obtained the elementary ideas of Geography. A rock, pebble, the door stone, or gravel in the streets, afford a useful and necessary inlet to the wonders of Geology. A table, pitcher, plate, apple, and every thing else which has form, embrace principles of Geometry, and convey to the infant mind, some of its first, most delightful, and most useful impressions.

What a pity that these *self-taught* pupils should be interrupted, in their rapid and thorough course of instruction, in subjects forming the ground-work of all knowledge, and of success in every human pursuit. Would it not be better to throw in their way, helps to speed their course, than to block it up by obstacles, as cheerless as they are insurmountable? By a globe, and maps for Geography, specimens of minerals for Geology, and solids and diagrams for Geometry, with a slate and pencil for drawing and writing, *encouraged by the parent or teacher,* no child fails to be employed, interested, or to learn to read, write and spell, sooner and better than one does, or can learn, from mere formal lessons from the generality of books. Can any person with an ordinary share of common sense and one moment's reflection doubt, that natural instruments of instruction, furnished directly and in great variety and richness, by the hand of our Creator, are more appropriate for the intellectual and moral creatures of His power,

in their early thirstings and reachings after knowledge, than the instruments of human contrivance; furnishing at best, but the *arbitrary signs* of knowledge? Is not the alphabet of Geology, showing the elements of our globe, which can be learnt by any child of three years, in a week, more appropriate for such a pupil, than the alphabet of books, upon which children often spend three, six or twelve months, and then not receive from it one distinct sensible idea? Facts without number, both in Europe and America, prove that these ardent *self-instructed* pupils when furnished with well-selected lessons from the volume of nature, aided by books of illustrations and simple descriptions of the same subjects, as certainly acquire the mechanical arts of reading, writing, spelling, &c., as they learn to talk; and for the same reason—to acquire and communicate ideas.

When once started in the track of knowledge—*real knowledge;* not unmeaning words, they find no place, or occasion, or disposition, to stop in their course. From the first pebble that meets their eye, they proceed to the elements and structure of our whole globe. From those to the upheavings of mountains, and the outbreakings and outpourings of volcanoes; they are thence led to examine the great monsters and little monsters, once teeming with life and action upon our earth, but now forming a great part of the rocky mountain masses composing the earth. From the elements, the structure, divisions, motions, changes and productions of the earth, their attention is naturally and necessarily carried to the heavens—from Geography and Geology to Astronomy. From the speck of time allotted to us here, the attention and desires reach to eternity; from things physical to things spiritual; from earth to heaven.

Emulation.

The present age is emphatically one of innovation. The strong, and perhaps salutary chains of custom, by which individuals and nations have been so long and so forcibly bound, seem to have been snapped asunder, and the world, released from its confinement, appears to exult wildly in a strange, and before unknown liberty. Principles, which have received the sanction of ages, are torn up by the roots to give place to untried theories, whose only merit, in the majority of cases, is their novelty. Institutions, venerable for their antiquity, and hitherto revered for their utility, are abolished with the most unscrupulous temerity, while modes and systems, the propriety and excellence of which no one had hitherto dared to doubt, are disorganized, and overthrown after the slightest deliberation. To many, this tendency to revolution appears to promise great and useful results, if not immediately to us, at least, to succeeding generations. But amidst the chaos and ruins of falling institutions, and crumbling systems, would it not be well to pause and reflect, ere we proceed, by what means they are to be replaced? Let us remember that most of these principles, which we are so earnestly desirous to abolish, are the result not of the *wisdom and experience* of *one* generation of men, but of the successive efforts and emendations of *many*, and, that each succeeding age should rather aim to improve and amend, than utterly to cast down and abolish. This wild and irresistible impulse to change, seems rather the effect of a universal feeling of self-sufficiency and confidence of intellectual power, the concomitant sometimes of feeble minds, than the natural consequence of actual superiority, either of intellect or intelligence. If we tear up the venerable and stately oak, to examine its depth of root, we must plant anew, and we thus deprive *ourselves* of its benefits, and confer nothing but a pernicious example upon posterity. Revolutions are often necessary, but they are always dangerous.

It is better to endure the disadvantages of an inferior institution, which, from its age, has become as it were, sacred, and therefore influential over the public mind, than to supply its place with one, which, though much superior, would, from its novelty,

fail to excite the confidence and respect of society. Even "*amendments*" in such cases, should be made with extreme caution—but with how much more should an entire abolition. This restless spirit of innovation, therefore, so prevalent at the present time, and in this country, is to be viewed rather, it seems to us, with suspicion, than hailed with delight, and, if not checked, should at least be *cautiously* encouraged. The wisest of human speculation cannot be so valuable as experience, and the hypotheses of the present age, however intelligent and scientific, are but hypotheses; and, therefore, compared with the accumulated experience of all past ages, dwindle into insignificance.

Though all departments of human knowledge have been more or less affected by this influence, yet there is none which has been so mercilessly mangled, torn and hacked, as the science of *Education.* Among the stately fabrics of human knowledge, these venerable structures, which stand, exalted as it were, on the pillars of time itself, proclaiming the thought and intellect of departed sages; those monuments on which we read the names of Cicero, Coke, Hale, Washington, Franklin, Jefferson, and a host of others, among these the sciolist lifts his gaze with awe-struck admiration, nor dares to assail them with the finger of desecration. But no puny tyro is so timid as to refrain from trampling down the productions of pedagogical experience. The conclusions of him who has carefully watched the actions and idiosyncracies of children during many years of constant labor, are to be viewed with suspicion and contempt, while the upstart and *quasi* philanthropist, whose benevolence is far exceeded by his vanity and ignorance, is set up as an educational dictator, by whose pompous and arrogant *ipse dixit*, the discipline of thousands of unfortunate children is to be guided. O, could they appreciate the wisdom of Shakespeare's saying, "If to do were as easy as to tell what were good to be done, chapels had been churches, and poor men's houses princes' palaces," how justly would they be abased in their own estimation. But Shakespeare's wisdom has nothing to do with the *science* of the present day. How could it, indeed, when even Solomon's heaven-inspired dictates have become obsolete and

contemptible? In his time, indeed, children, as well as men and women, were fallen beings, possessed with evil passions and headstrong volitions; but, in modern times, it is far different; every child is an angel, whose mild and tender nature needs not the severity of discipline, but a kind and genial nurture, suitable to its celestial constitution! Truly does Horace say, "Dum stulti vitant vitia in contraria currunt." "Emulation is laudable," is an apophthegm which, during many years, has been reiterated constantly in the child's ears, presented to his view on the walls of the school-room, and placed before him as a model of chirography, until, indeed, the sentiment has become, as it were, a part of his intellectual nature—a first principle—a moral instinct, whose force and propriety are as undeniable as the physical laws of his being. But the child is now to unlearn this almost indelible impression. It has become a relic of the ignorance and barbarism of our rude and Goth-like ancestors, and must be mentally erased, since it has been condemned by the educational judiciary of modern times. And is there no appeal from this dogmatical and haughty tribunal? Shall truth be as nothing weighed against quackery and fanaticism, or shall the dictates of common sense be drowned in the uproar of enthusiasm? No, truth cannot be crushed, and, while there is an intelligent and rational public, who keep the equilibrium of their minds undisturbed by the influence of idle speculation, the *right and custom* of appeal, it is hoped, will not be lost. And though King Philip be drunk to-day, it is probable he will be sober to-morrow.

It is this position, that emulation is a baneful principle, that we intend, in the present article, to examine; and, in doing so, we shall view it as impartially and dispassionately as the nature of the subject will permit. It is not our object either to blind ourselves or our readers by prejudice, but carefully to review the merits and objections of the system of awakening intellectual activity, by means of exciting the emulation of the child.

Non fumum ex fulgore sed ex fumo dare lucem.

Let it be premised that by emulation, we mean the *desire to excel*, not as an intermediate, but a direct motive. The child who

endeavors to excel, for the purpose of obtaining a reward, cannot properly be considered under the influence of emulation, but the love of gain, or the hope of reward—different principles altogether; but when it strives to excel, merely from the inherent *love of excelling*, it is strictly controlled by the influence of emulation. That this is a strong and prevalent passion in the human mind, no one can doubt who is at all acquainted with human nature, nor that in some minds it is the *predominant* characteristic. It is to be viewed, then, both as to its effects upon the intellectual and mental character of the individual.

Upon the intellectual operations of a human being, there is no principle, motive, or passion, which exercises a stronger or more general dominion. The possession of mental excellence has always, in a state of society, which at all approaches to civilization and refinement, been preferred to physical superiority, and not only on account of its very dazzling nature, but for the vast power and influence which it commands. The man who possesses the strength of a Sampson, is still but master of *one* man's might, but he who is intellectually superior to his race, commands the strength of thousands. By physical might alone, Cæsar or Napoleon might have been crushed by almost any soldier of his army, but by intellectual might he ruled the destinies of whole nations, and the world trembled at his power.

The love of mental excellence is, therefore, one of the most potent feelings of man's nature. Scarcely can an individual be found who is entirely independent of its influence; nor is it desirable that there should be. That every man should desire and endeavor to excel in some particular department of human science or human action, is both salutary to himself, and necessary to society, equally as that every member of the community should have a useful employment of some kind, and in it exert his utmost ability; and if this be true, it is not easy to perceive why it should be less beneficial in the school-room, that every scholar should endeavor to excel in those studies to which his attention is directed, and by which he is to be rendered a useful member of society. It excites to industry, awakens attention, prompts intellectual activity, and instils habits of application,

which are of incalculable value. Where there does not exist naturally a love of learning and study, by means of the constant practice which it occasions, it supplies the deficiency. It is as powerful over the minds of children as of men, and the sublimest geniuses are not superior to its influence. Thucydides was fired with a glorious and noble emulation as he listened to the annals of Herodotus, and became an immortal historian; the praises of Miltiades aroused the energies of Themistocles, which previously had slumbered in drowsy and inglorious ease, and he became the saviour of his country. The spirit of emulation must, therefore, be a strong and invincible motive to exertion, and even those who decry it, are generally actuated to some extent by its influence. Against this influence, therefore, which it exerts upon the intellectual operations, no objections can be urged. It is a stimulus to mental action, and an efficient one, and in this respect is therefore valuable.

But its effects upon the moral character are much more complicated, and it is to them that the objections, above alluded to, are made. Emulation originates from, and must foster, if encouraged, one of two principles, the love of praise, or the love of self. An excess of the former would be what we call vanity; of the latter, pride. That both these principles should control to some extent the moral feelings of every person, we positively assert, but at the same time admit, that when they, or *any other principles*, become uncontrollable passions, and engross the whole dominion of the soul, they are positively pernicious. That no appeal should be made to them, we are very far from believing, but consider that a due and necessary discrimination should be made. We would not recommend that a child should be permanently rendered a victim of vanity, to excite intellectual activity, nor that a torpor of the moral feelings should be produced to banish a torpor of mind. There is great danger in extremes, and we consider that like all other gifts of Providence, we should *use* the faculties of the soul, and not *abuse* them. The love of approbation is an inherent principle of our moral constitution. Every man is prompted strongly to those actions, and that species of exertion by which he may obtain the esteem and consideration of mankind, but shrinks from the performance

of those actions which are disreputable, and considered unworthy by his associates.

By the most celebrated metaphysician of modern times, the immortal Locke, this principle was styled "the law of opinion or reputation," and in this he has been followed by many of our modern jurists. It is indeed a law, as strong and inviolable as the great laws of our physical nature, and therefore cannot be infringed by any man whose moral nature remains pure and unsophisticated, either by improper education or the rationale of a false philosophy. It is not what he himself deems positively good and exemplary, that a man in general pursues, but what his age considers so, and wo to him who dares to rebel against the universal opinion of his own times. The arts and sciences are subject to the dominion of this principle, and flourish or decline according to the prevailing taste of the times. "Honos alit artes, omnesque incenduntur ad studia gloria, jacentque ea semper quae apud quosque improbantur."

The great principles of morality must remain constantly the same; they admit but one opinion, and require but little deliberation to perceive their truth and propriety. We embrace them either as the revealed will of God, or as self-evident truths. But in the various professions and occupations of life, modes of dress, arts and sciences, and literary pursuits, the law of opinion forcibly and universally operates. In considering these, we no longer think for ourselves; custom, and the opinion of the age in which we live, direct us, and we passively submit. Is there anything from which results distinguished honor? Every one attempts its achievement. Is there anything generally stigmatized? All whose aim is respectability and the esteem of men, eschew it.—The principle, therefore, by which we are actuated to the performance of those things which acquire for us the applause of others, is a strong and all-prevailing law of our nature, and, as it operates in society at large, it must operate in the school-room. The teacher himself feels its influence in the performance of his duties, and the child must also experience it in the prosecution of its daily tasks. The object of a correct system of education is not to *eradicate* known and dominant principles of the human mind, but

to *cultivate* and *direct* each, with an attention proportioned to its peculiar importance.

Nor is the fact to be disregarded, that no system is applicable in all its details, to individuals of every capacity, disposition, and constitution of mind. There should exist in the mind a perfect equilibrium, as well among the intellectual faculties, as the moral feelings, and, when either, by injudicious education or natural deficiency, this mental balance is disturbed, the object of the teacher should be to restore or produce it, as much as possible. To effect this, it is necessary to stimulate and encourage some faculties and principles, and check the luxuriant growth and precocity of others. This rule is particularly applicable to the employment of emulation as an incentive to intellectual action. A careful discernment should be exercised. The skilful teacher ought to be as practised and expert in the diagnosis of mental diseases, as the accomplished physician is in those of the body. When a *passion* for praise naturally exists, it would be ruinous to encourage its growth ; it would be instilling a subtle poison in the bosom of the child, not only to blast its happiness forever, but totally prevent moral and intellectual improvement. But are we to conclude that, because the desire for praise may be encouraged to an excess in some cases, it is pernicious in all, and should be totally eradicated from the mind, as a deadly and poisonous weed, near which no flowers of virtue ever can bloom ? This would surely be the extremity of folly. All history and experience refute the fallacy; and only a slight consideration is necessary to convince an impartial mind, that we owe much of our refinement and progress in the arts and sciences, to its influence on the minds of men. Philosophy, poetry, oratory, music, and painting, must have remained in a neglected state, had praise exerted no power over the mind. No natural inclination in a virtuous mind, however powerful, would survive the conviction, that an indulgence of it would excite the disgust and hatred, rather than the esteem and applause of others. Poets, painters and musicians, to whom we owe so much of the refinement of society, have loved and followed their arts as the means of acquiring the approbation of men. Praise has been the object which they have in general pursued, and without it, the muse would have been abandoned.

"A simple race! they waste their toil
For the vain tribute of a smile;
E'en when in age, their flame expires,
Her dulcet breath can fan its fires;
Then drooping fancy wakes at praise,
And strives to trim the short-lived blaze."

Nor is it the enjoyment of praise alone which has animated the poet's mind, and inspired him with enthusiastic ardor; the distant expectation of posthumous fame and applause, has cheered his soul, when plunged in the most distressing circumstances; has rewarded him for years of patient toil and suffering, and been the consolation of poverty and old age. Milton, though neglected in his own times, and though destined to see his glorious productions despised and unnoticed, with greatness and tranquility of mind anticipated the applause of after generations. Horace, with all a poet's egotism and rapture, exclaims:

Exegi monumentum aere perennius
Regaliqui situ pyramidum altius, &c.

Virgil's expectations were of a similar nature, and Ovid's still more extravagant. These examples suffice to prove the power with which the desire for the respect and admiration of others sways the minds of even great men. Nor in the instances cited was any observable injury derived from its influence; on the contrary, it actuated the achievement of works which have been the wonder and admiration of all succeeding ages.

Nor should we be more scrupulous of employing this incentive from the fear of exciting pride in the mind of the child. The same remarks are applicable to the love of self, as a principle of the human mind, as to the love of praise; it is dangerous only as a passion, and no man can be a reputable, or a valuable citizen, who does not possess it. He who has no regard for himself will scarcely regard others, and, if he has no confidence in his own honor, virtue and abilities, he will never succeed in any great or useful enterprize. On the contrary, the greatest and most useful men have been, in general, the most self-confident. Vacillation, timidity and weakness, ever fill its place when deficient. Shakespeare's advice has ever proved true:

"To thine own self be true,
And it must follow as the night the day,
Thou canst not then be false to any man!"

Besides the influences mentioned, emulation possesses a very important one over the dictates of the conscience. As an illustration of which we may cite the anecdote of the nobleman, who, being the lineal descendant of a long line of ancestry, taught his son to emulate their great and virtuous qualities, by taking him every morning through the halls where all their statues were placed. This desire to emulate the virtues, either of our ancestors, or of other men with whom we have no relationship, is a rational, prevalent, and a commendable feeling, implanted in the human mind by the great Creator, for the wisest purposes, and with the best results. And it would not only be absurd, but impious, to attempt to eradicate it. Who would not admire the sentiment which Byron expresses so well in one of his juvenile poems?

"Shades of heroes, farewell! your descendant departing
From the seat of his ancestors, bids you adieu!
Abroad or at home your remembrance imparting
New courage, he'll think upon glory and you:
Your fame and your memory still will he cherish,
He vows that he ne'er will disgrace your renown;
Like you will he live, or like you will he perish,
When decay'd may he mingle his dust with your own."

As a means of cultivating this feeling, the study of biography has been considered useful, and it seems to us with a great deal of propriety. But if all emulation is to be extinguished, it would, of course, be positively pernicious for a child to read a book on this subject, as he could not do so without feeling emulation. And why is it more injurious for the child to emulate the industry and good qualities of its companions, than the wisdom, perseverance, and noble exploits of sages and heroes, who have long left this sublunary scene? If the qualities which are emulated, are really and intrinsically good and exemplary, the emulation of them is equally commendable, and pernicious results cannot accrue from its exercise; hence, instead of extinguishing this principle, the business of the teacher is to direct it, and, with the utmost vigilance, guard against its being exerted on an improper object. If the moral feelings, in other respects, are correct, no child can be injured by emulation, and it is the wildest fallacy to suppose so.

Nor do we imagine that the principal opposition to its employment in schools has originated from an anticipation of its immoral and dangerous tendency. It seems to us almost an insult to common sense to believe so. But we believe that emulation has been *decried* as not being in perfect accordance with *transcendentalism.*

The child must do good and be good from an inherent love of goodness, and not from any secondary motive. And any system of education, not founded on this principle, is erroneous, and productive of injury. Such is the doctrine of transcendentalists; a doctrine which we shall not attempt to confute, as its absurdity and falsity are manifest to every sound mind. The most correct definition we could possibly give of transcendentalism, is, that it is the antipodes of common sense; and yet, incredible as it appears, many of its subtilties are becoming prevalent and popular. The reason is obvious; they seem excellent, and would be indeed worthy of admiration, provided they were not *false.* This is their only demerit, and in this their great danger consists; they are in fact, *sugared poison,* sweet to the taste, but deadly as arsenic. The errors and perils of this deceitful system have not, as yet, been sufficiently exposed, and it is incumbent upon those who have the interests of education at heart, speedily to do so, for nothing is doing so much injury, at the present time, to the cause of educational science. More especially does it behove teachers to awake and observe how rapidly these dogmas are sapping the foundation of their noble profession; a profession from which all others spring, and on which the welfare and very existence of society depend. The disease has far progressed, and it is time to apply the remedy.

Immedicable vulnus
Ensi recidendum; ne pars sincera trahatur.

April, 1847. H. K.

☞ A well written article in reply to the above, may have an insertion in the American Journal of Education, as it is our purpose to allow of free discussion.—[Ed.

Thoughts on the State of Education in the Southern States.

(Continued from page 122.)

Among other causes of the backward condition of the Southern States in the matter of Education, not the least influential, nor the most easily overcome, is a predilection in favor of higher institutions of learning, to the almost total neglect of the common schools. As a general thing, the Educationists of the South aim too high, and in their eagerness for excellence, forget to lay the foundation upon which that excellence should be based.

In the recent School Convention of Virginia, held a year since, in the city of Richmond, the principal subject of discussion was the relative claims upon the State for the patronage of her University and Colleges, and the proposed common school system; and, although the friends of a general system, succeeded in securing the adoption of their measures by the Convention, yet her partialists, with the aid of a few timorous politicians, were able to defeat them in the Legislature; and another decade of years must pass, before Virginia will have secured to herself the inestimable blessings of common schools.

So has it been in other States; the partial and exclusive system has been tried from the earliest commencement of their history; money has been bestowed with an unsparing hand; and yet the people are not educated, nor are the pet institutions equal in any respect, to the self-sustained colleges of the North, and many of them are inferior to a Yankee district school.

The reason is obvious; those who ought, and who could, and would support them, and fill them with wealth, and talent, and energy, are left out of the reckoning; the industrious farmer, the mechanic and the laborer, and their hardy sons, are virtually excluded from them.

There is no truth more susceptible of demonstration than this; that the university, the college, and the academy, will always flourish just in proportion as the common school, whence they should derive their supply of *matriculates*, prospers. "A little leaven, leaveneth the whole lump," but that little should not float

on the top of the mass. No sensible architect will begin the construction of his edifice from the top and build downwards.—Education, like light and heat, must ascend; but the educators of the South, have been engaged in the futile attempt to educate downwards, to force the genial warmth of thought, and the light of mind, to descend; such a course is no less cruel than unphilosophical; and the results are shown in the neglect of all provision for elevating the common mind, and in the desertion of those very halls of science, where such feats of moral magic, and intellectual legerdemain, were to be performed. Why are the colleges of the South so poorly sustained? Why are they so dependant upon legislative charity? There is but one answer; there are no common schools from which they can be filled; there are no eager multitude of youthful revellers at the feast of Science, who might, after having imbibed a taste at the common school, rush to the more abundant banquet offered in the higher institutions.

Since the adoption of the crude and piecemeal school system of Maryland, these institutions have kept up a continual and suicidal struggle with the people, and their system about a State donation of some twenty thousand dollars, which has been accruing to them since their foundation. The colleges and academies struggling to retain it, and the people to distribute it. I design not to take part in this unhappy controversy, but while stating the grounds of it, I may be permitted to remark how great the pity that the friends of the colleges cannot, or will not, see that it is not dollars they need, but pupils; it is not wealth nor patronage they require, but talent and energy; they have already too much wealth, and too much State favoritism; they have learned to depend upon this; take it away, or let the colleges apply it to a preparatory school, and they will soon have what they need, a mass of suitable material to work upon.

It is urged by the people, in this controversy, that as the tax by which the "Academic Fund" is raised, is a general one, its distribution should be general; that the situation of the academies and colleges in towns and villages, where board is high, prevents the mass from taking advantage of the condition of the grant, which

is; that for every hundred dollars received, one poor child shall be educated gratuitously; and which in fact is rarely done, and that more good could be done with the fund by its general distribution.

On the other hand, it is alleged, that as the wealthy class pay the larger proportion of the school tax, it is but just that they should reap the benefit of it,—that it is useless to think of a common school for their children, and that in fact, the "Academy Fund" is a kind of bonus, or douceur, given by the State to her wealthier citizens for the privilege of taxing them to support the common school,* and that provision has been made for the education of a fair number of poor children in the higher schools.

The grand error in the whole of this matter, lies in the misconception of the *benefit* claimed by the respective parties.

It is certainly a very narrow view, to imagine these benefits to be nothing more than the amount of instruction individually and immediately received by the children of either party.

It is true the wealthy citizen pays a larger portion of the tax; this is, however, but the price of protection to the whole; a little of his resources given to procure the most effectual security to his life, character, property, and happiness. It is the condition upon which he may expect to continue in the enjoyment of civil and religious liberty, and the blessings of a free government: "he must either pay for the education of the people or for their vices," and the former is the better bargain at any price. Suppose his child to reap the exclusive benefits which he claims, how does his

* This argument in favor of the "Academic Fund," I have heard used but once, and then by the Hon. Philip F. Thomas, of Talbot county, Md. It is truly a novel doctrine that the State must pay the wealthy for her exercise of a right to tax him to secure to him his wealth. "Do you suppose," asked Mr. T., "that Col. G. would consent to pay his school tax, if the State did not appropriate a part of that tax to educate his children?" The answer is very plain and simple; let Col. G. send his children to the school which the State has established with his and others money, for all; and he will have no cause to complain. It is true, his children will there meet with the poor man's child on a footing of perfect equality. But my excellent friend, will not, I am sure, object to this development of *democratic republicanism*.

condition improve, if surrounded by a mass of ignorance and vice? He must either be a tyrant, or a slave to his fears; he must consent to exchange the benefits of a well-regulated government, for a life of anarchy and misrule; for the security of law, he must submit to lawless violence, and popular licentiousness; for, it is not by prisons or penal codes; it is not by force or fraud; it is not by the exclusive and distinctive development of talent, that the American people are to be governed, but by the force of a well-cultivated common mind.

Of every species of inequality which can obtain among a free people, none is so fraught with danger as that of mind; an aristocracy of wealth, or family, or fashion, is contemptible and transient; but the power of an exclusive education is permanent and perilous. Without wishing to verge into the arena of politics, I may here remark, that under the regime of old Federalism, in every place where that party had the ascendancy, the utmost attention was paid to education, and it is a remarkable fact, that in every such place they have uniformly maintained their power amid all the changes of party, and metamorphoses of names; and at this day, nearly all the places of honor and emolument, are held in those places by the descendants of the old Federal school.

But it is needless to argue that "Knowledge is power," or that power so derived may be used to increase the influence of the demagogue, and subvert the liberties of the people. The common mind is the nation's great treasure, and he who robs her of that, steals her very life-blood; the skeleton may remain, but the spirit will have fled; every vestige of liberty will have been swept away, and the strong arm of despotism alone can snatch the few, from the unbridled vices of the many, and convert a nation of freemen into a horde of slaves. A few words in relation to the practical working of the two systems, will lead me to the consideration of another topic.

Where are the alumni of the academies and colleges of the South? By their own means, and the aid of the State, they have received the exclusive benefits of these higher institutions; for it is alleged, though not admitted, that the very existence of these

places of learning depends upon State gratuities. What are these beneficiaries doing? As a general thing, they rush into some over-crowded profession, and seek to live by charging five dollars for being asked a question, and ten for answering it; and if questions do not come fast enough, they take the distinguished post of the leader of a pot-house clique of politicians, and the talents which might have reflected honor upon the institution where they were developed, are wasted upon factions and cabals, and perverted by the basest vices.

On the other hand, what might be expected from the graduate of a district school? That he would enter college and secure its advantages, and then taking his place in the common schools as a teacher, prepare others for the same honorable distinction.

Some of the best parish schools in Scotland were founded by poor boys, who having accumulated fortunes, gratefully and liberally bestowed it in building up similar institutions to confer similar benefits on others. Then the South would not suffer, as she now does, for the want of competent teachers; the graduates of her own colleges would gladly and cheerfully step forward to discharge the duties of the now despised schoolmaster. At present, such is not the case; although there are thousands of young men, able and competent, the sad truth must be told; they are too proud and too lazy, to devote their time to the instruction of poor men's children; they prefer the race course, the gambler's den, and the political arena.

I have heard an anecdote of Harrison Gray Otis, which will not be out of place here:—It is said, he was standing in front of the Capitol at Washington, when a representative there, looking down upon a drove of mules and asses passing down the avenue; a gentleman from the South, also a Representative, came up, and laying his hand upon his shoulder, observing, "your constituency, Mr. Otis, coming to pay you a visit, I see." "Not exactly sir," replied the Yankee legislator, "but a *part* of my constituency coming down to teach your constituency." The retort was no less true than caustic; the South has been, and is, and ever will be until a new and better system is adopted, dependent upon the North, for men to discharge the responsible duties of educating

her youth; and my own acquaintance with such as she does obtain, leads me to believe that Mr. Otis was nearer the truth than many would suppose.

An intelligent and candid political candidate in Dorchester county, Maryland, in discussing the school system before the people, a few years since, said, that if a man desired to make a fortune at once, let him collect the teachers of that county, and take them to the North, and no menagerie would attract greater crowds. Nor, judging from Judge Legrande's report, made to the Legislature a few years since, and noticed in the last number of the Journal, can we believe this to be an exaggeration. It is stated in that Report, that the committee had addressed letters to the clerks of the several counties, asking for information relative to the number of schools, &c.; and that from one they had received answer, that there were "some schools in his county, he knew by the receipts of teachers, then in his possession, *many of which receipts he could not read !*"

It is useless to pursue this painful subject farther; the Southern States want each a common school system, aiming to instruct all, embracing all, equal to all. That system will need a head, and good native teachers; for the prejudices against Northern men are too strong and too general, to admit of their utmost usefulness; these teachers should be carefully examined by competent persons, say by a board of teachers, and not as now, by men who know not the very first requisite of a good teacher; and who, as I have known, will deem it their duty to inquire how far the ecliptic is from the equator, and yet forget to ask the candidate if he understands simple proportion, or knows what should govern an objective case. Having secured good teachers, the next object should be to treat them with respect, and *pay them well*; and not, as is now the case, have a separate table for them from their guests, and grudgingly pay them 250 dollars per annum, and make deductions for every day lost, whether from the sickness of the teacher, to which he is peculiarly liable; or from the want of fuel or other necessaries to conduct the school.

Is it to be expected that a competent teacher can be employed for such a salary? None but a fool would agree to take it, and

yet it is the general average. A man of talent, or common sense, could make double as much in any other employment, and he could give no stronger proof of unfitness than to make such a bargain.

I would that I could arouse the attention of Southern men to the importance of this great subject, for until this is done, until they shall forget their dissensions in regard to legislative patronage, and seriously set to work to adopt a system of general education, concentrating upon that all their means, all their resources, and all their energy, it would seem useless to begin the examination of any particular system which might be proposed; yet in my next, I shall venture to present the outline of such a one as would appear to me best suited to the peculiar character of the country and people.

When will the Southern States *begin* to wipe off the foul stigma of ignorance that rests upon them?

VIRGINIUS.

West Point.

West Point is on the Hudson, about fifty-four miles from New York. The highlands strike the river at the Point, and the country is mountainous for some distance along its banks. The Academy buildings stand upon a plain, the distance around which is about a mile, and which is elevated three hundred feet above the river. The road from the wharf, where the steamboats land, is a fine broad one, and rises in a gradual slope so exactly, that its whole surface lies in one plain. The Academy buildings, the barracks of the cadets, and the dwellings of the professors and officers, meet the eye on reaching the top of the hill, and the beautiful green and level plain on which the drills and parades are held, is a pleasant object, even when martial music does not sound from its midst, and its sod is not trodden by disciplined battalions.

The number of cadets is about two hundred and fifty, or near the number of members of the House of Representatives. They are divided into four classes; one class graduates every June, and a new one is appointed and makes its entry as the fourth class; and at the end of four years graduates as the first class, so that the number of classes is always four, and one graduates each June in its order. Each representative district in the Union is entitled to have one of its residents always at the Academy, who is nominated by the member of Congress from the district, besides which, the President is allowed to appoint ten taken at large. The age at which a cadet can be appointed is now fixed between sixteen and twenty-one. The new class, which enters in June, numbers, perhaps, one hundred members; but the studies and discipline are so severe, that at the end of four years, probably not thirty of these will graduate; of the rest, some of them have been unable to go on with the studies, others have resigned, weary of the restraint, and some, perhaps, have been dismissed for bad conduct; those that remain are the flower of the class. The previous knowledge required of a new class is not great. Its members are examined on the first five rules of Arithmetic, Vulgar and Decimal Fractions, and the Rule of Three, together with reading, spelling, and writing; besides which, they must be examined by a surgeon, to ascertain if they are capable of enduring the fatigues and hardships incident to their dangerous profession. About the 20th of June, the whole corps of cadets leave their barracks and encamp upon the plain, where till the 1st of Sept., they live entirely in tents, and perform the duties of private soldiers in time of war. This is their vacation. It consists in drilling, sleeping in tents, rain or shine, and mounting guard day and night. One class is absent during this interval, the one that has been two years at the Academy; its members have now permission to visit their homes and this is the only time it is granted to them during the four years of their stay.

On the first of September, the camp is broken up; the cadets remove to the barracks, and the studies of the year commence. The new class begins Algebra, (Davies, Bourdon,) and French. They are examined on the whole of Bourdon in January. Those

who pass that examination, receive their warrants as cadets; those who fail, are at once dismissed; this is generally about twenty of the class. An examination is sustained every January after, on the studies of the previous six months, and every June on the studies of the whole year. Deficiency at the June examination always subjects to dismission. The first two years, "Davies' entire Course of Mathematics" is gone through with, together with a course of French, Moral Philosophy, Geography, Rhetoric, &c. The next two, the Mathematics are applied to Philosophy, Astronomy, Chemistry, Artillery, and Civil and Military Engineering—a course more severe, if possible, than that of the first two years. They pass their last examination, enter the army with minds and bodies disciplined and strengthened by study, endurance, patient and laborious investigation. The utility of the Military Academy has been demonstrated on the plains of Palo Alto, Resaca de la Palma, at Fort Brown, before the walls of Monterey, and at Buena Vista. At the first two, every officer that was killed or wounded was a graduate of the Academy. Its students were educated that they might die for their country, if duty demanded that sacrifice. They have not shrauk from its performance, whether it required them to lie down their lives on the field of battle, or to die victims to the Mexican assassin, or to the fevers and unhealthy heats and vapors of the Rio Grande. The first, perhaps, brought them honor, the last, but a nameless grave. It was for her service their country trained them, and they did not ask that they might choose their place of sepulchre.

Of the mathematical instruction given at West Point, a few words should, in justice, be said. When the French Revolution liberated a nation from the thraldom of ages, mind received an impulse and a development, which years of slavery could not have given. It began to enquire into the reasons of things; and that same feeling which prompted it to reject the doctrine of the Resurrection because it could not prove it by its own reason, caused it to investigate the laws of nature, and the principles of mathematics on which these depend, with an eager search. It need scarcely be said, one was above its reason, the other open to it. Descriptive Geometry was invented by a professor in the Polytechnic school, and the other

branches of mathematics were much improved. The English system of mathematics was entirely practical; it gave its chief attention to the working of problems and examples. The French went to the opposite extreme, and rejecting the problems and examples, as mere illustrations, gave to the exact reasonings, and the sublime theorems of mathematics, their undivided attention. It was reserved for America, holding the middle place between the two forms of government, and for her national school, to blend these two systems of instruction harmoniously into one. This was done by a graduate of the Military Academy, who being first an assistant professor in 1816, when 18 years old, was appointed Professor of Mathematics in 1823, and was the founder and architect of the present system of mathematical instruction there. This was Professor Charles Davies. His course of mathematical books is the result of many years of study and experience, aided by a clear and profound mind. From the Arithmetic to the Calculus, these two systems unite and move on in order. The reasoning by which a principle, or a rule of arithmetic is deduced, is as methodical and as conclusive as a demonstration in the analytical Geometry, though formed to be within the grasp of the younger and feebler minds to which it is addressed; and each principle as much occupies its proper place. We have received our language and our laws from England; it was natural that we should adopt also her systems of instruction. Hence our dogmatical arithmetics, collections merely of rules and examples, or attended perhaps, by crude, and often inaccurate definitions, and explanations; and our unreasoning algebras. It is not by the study of works like these that mind is made. It must reason, and reason accurately and in order, or it fails to develop in its just proportions.

Lecture on Geology.

☞ The following Stenographic Report of a Lecture on the facts in Geology, delivered before the Mechanics' Institute, Waterford, Ireland, by the celebrated Dr. Cahill, was communicated to us by our late learned and highly respected friend, P. S. Casserly, a few days before his decease. We are anxious both to preserve and diffuse it, as well from the intrinsic merit of the Lecture, it being, in our judgment, a successful defence of the Mosaic account of the creation, as from the fact that it will thus remain as a memento of disinterested private friendship.—*Editor.*

DEFINITION of the term Geology.—Variety of Opinions on the subject—Views of modern Geologists—Strata, fossils,—their order—Reasoning of Geologists—Attempt of some to reconcile their Geological views with the Mosaic account of the Creation—These views opposed to sacred testimony—The ability of Moses as a writer—Theory of days signifying periods refuted—Views of modern geologists opposed to the principles of science—Principles of deposits, precipitates, affinity—Influence of the Moon—Other objections—Geological phenomena accounted for on a correct principle—The Flood, its mighty force, carrying away animals from one region to another, stratifying materials, &c—Fusion accounted for.

GEOLOGY comes from two Greek words, meaning the doctrine of the earth; it is not a good term, but it is the one selected.

In approaching the present topic, I would say that persons of various creeds take opposite sides. The Rev. Doctor Pye Smith opposes the account given by Moses, though not with the intention of invalidating his testimony, and some others, as, for instance, the Rev. Dr. Wiseman, Catholic Bishop, unite with Dr. Pye Smith in the maintainance of similar views; their names rank among those of the greatest men of the day.

According to the sentiments entertained by these individuals, the earth is a large habitable globe; every mountain of which furnishes an argument, every valley a proposition: and in proportion as men dig into and expose its principles, they pretend to say that they find greater and greater antiquity than that given by Moses. Some assert that the outside was covered with a crust like the shell of an egg; others, that it was all fluid; while again a third party state, that the entire earth was a perfect solid. It is, morever, added, that water was heavier than iron, and air heavier than limestone.

The exterior crust of the globe is affirmed to be very deep, and composed of various sorts of strata laid over each other like the leaves of a book; it is said, that as we examine these strata or layers, we see insects, vegetables, plants, &c., as so many credible witnesses bearing infallible evidence to their age; and that going down deeper and deeper every thing corroborates the testimony they wish to bring forward as to the exceeding great antiquity of the earth. The lower stratum, they tell us, was put there first, and the upper last: and they would quarrel with any man asserting the contrary, and look upon him as a maniac upon whom geological science were vainly expended.

They go on to declare that the lower stratum is exceedingly hard, and the lowest of all a great deal harder than any clayey substance with which we are acquainted; that in the lower, organic remains are found called fossil plants, fossil insects, fossil bones, and owing to its extreme induration, it was evidently not made for culture; that, although this stratum was different from the one above, it was designed as the groundwork of its superincumbent layer.

After referring to the lower stratum, they come to the next, which they divide into three principal ones, and above this they again find fossil plants. The word fossil is derived from the Latin *fodio*, to *dig*. Fossils resemble petrified pieces of wood, &c.; and, as the term imports, are dug out of the ground. Fossil remains are said to bear unequivocal indications of being older than the earth, and therefore infinitely older than the Mosaic account.

The earth is thus proved to be the result of a very old growth; having first rock as its foundation, then rock and strata; then, rising higher, stratified animals and plants are found; then accumulated materials; then known animals and plants; then mineral compositions; then the land fit for vegetable products; and after that an upper surface where creatures exist for the use and support of man; all of these lying over one another, and undergoing many variations like the different coats of a building.

Besides adverting to the changes to which I have alluded, they say that shells are found on the tops of mountains; and how can

these be here if they were not once at the bottom of the sea? The bones of fishes certainly corroborate the fact, that what is now land was originally under the water. Reptiles, too, are discovered with a form much lower than is now known. And in addition to all this, lions are found buried twenty feet deep at the north pole; and how can we account for so strange a circumstance, unless the north pole was formerly the tropical region.

Thus our modern geologists try to prove that the age of the earth is so great as to have had no beginning. Moses undoubtedly, say they, must have meant something else, or his account cannot be authentic. To surmount the difficulty, some of them state, that Moses intended by the six days of creation, six indefinite periods, and that the great Being who inspired him to write, meant six very long periods; that the morning and evening, spoken of in the first chapter of Genesis, meant some number of years, the whole embracing several thousands of years.

It is asserted by these philosophers, that the earth grew like a tree, and came to maturity on the same principles; that it was at first very small—a mere nucleus, and that by the accumulation of stratum after stratum, it attained its present magnitude. Amazing, to see how it arose from an insignificant ball to its present gigantic bulk! Some have decided that it took forty thousand years, some eighty thousand; and others even a yet longer space to come to perfection. Moses, therefore, in mentioning six days, must have intended to convey the idea of six very extensive periods, otherwise the changes described could not be rationally accounted for.

Here, then, are the opinions of several of our geologists. I need hardly say that I disagree with them, that I take altogether different views; and the reason why I do so shall soon be submitted to the reader's consideration. I speak in unison with the sentiments of many others, distinguished for their ability, though not the greatest in names. Baron Cuvier takes the lead on the opposite side, and all follow him. I follow great men, but we do not reckon so many as our opponents, if I may so call them.

The system they have espoused is adverse to sacred testimony, and at variance with the principles of science. These positions

I shall endeavor to sustain, and afterwards show the real cause of the changes to which reference has been made.

It is opposed to sacred testimony. Moses was the writer of the book of Genesis, and he was exceedingly competent to write. Independently of regarding him so, from the office he held as leader and governor of the people of Israel, we must conclude that such was the case, from the probable fact of his being highly educated. Pharaoh had issued a decree, that every male child, born of the Hebrews, should be drowned. Moses was put into a little basket and left by the river side. Pharaoh's daughter happening to pass at the time, and hearing the infant cry, sent her maid to take it up. The sister of Moses, who was watching at a little distance to see what might become of the child, comes up and asks permission to procure a nurse, and being sent on the embassy, she brings the child's mother. Writers suppose, that under the fostering protection of royalty, Moses received a court education.

Furthermore, he was the writer of God's chronicle, and not likely to make a mistake in putting down plain facts. He had, beside, vast advantages from the time in which he lived, and the circumstances connected with his situation. The patriarchs lived to a great age. Noah was intimately acquainted with Adam's children, from whom, no doubt, he derived, in frequent colloquial interviews, the information transmitted by our great progenitor. So great was the longevity of man in that age, that hosts of historical and of geographical evidences must have been afforded in a direct line. It is not at all likely that Moses could have been imposed upon in anything he had heard.

In the first chapter of the Bible we have an account of the creation. We need not read it all over; it would occupy too much time; we may read a few passages. After perusing a short extract, the Doctor proceeded to observe, by the different *days* spoken of here, can it be possible that Moses meant indefinitely long periods, in order to fall in with the creed of geologists; thus making geology instead of Scripture the unerring criterion.

The term *days* is employed one hundred and forty-four times in the Pentateuch, and in each instance it evidently signifies

twenty-four hours. Surely the same pen writing this so often would not use it in a variety of senses. In the seventh chapter of Genesis, it is recorded, that Noah went into the ark; and God said "it shall rain forty days and forty nights." Here, then, the *days* plainly mean ordinary days and nights Again we read, "in the six hundreth year of Noah's life, in the second month, seventeenth day of the month, all the flood-gates of the great deep were broken up, and the windows of heaven opened." Here we have years, months, and days, distinctly mentioned and in regular subordinate succession. "And the waters prevailed upon the earth a hundred and fifty days." Did it remain all that time in the sense of *days* meaning immense periods? If so, the waters remained so many thousands of years.

We are told that the ark rested on the mountain of Ararat. Now mark how plainly the word *day* is used. "And it came to pass at the end of forty *days*, Noah opened the window of the ark which he had made; and he sent forth a raven which went to and fro till the waters were dried up from off the earth. Also he sent forth a dove to see if the waters were abated from off the face of the ground. But the dove found no rest for the sole of her foot, and she returned unto him into the ark; for the waters were on the face of the whole earth. Then he put forth his hand, and took her and pulled her into the ark. And he waited seven other *days;* and again he sent forth the dove out of the ark." Had he waited so many thousands of years, the bird must have been so old. Is it requisite to quote any more texts to show the absurdity of this interpretation? It is useless to explain the Hebrew term, as it imports nothing more than what is conveyed by the English word.

We have, however, from the same source a still stronger argument, one so forcible that I never gave it to an antagonist without witnessing the severe struggle it produced, nor without receiving an acknowledgement that the subject had never before been considered in so convincing a point of light. It is drawn from the second chapter of Genesis, from the first to the sixth verse inclusive, "So the heavens and the earth were finished, and all the furniture of them. And God rested on the seventh *day*." Did

he rest several thousands of years? At the sixth verse we read, "there went up a mist from the earth and watered all the face of the ground;" and in the context it is stated that "the Lord God had not caused it to rain upon the earth." For what reason was rain withheld till now? The sun had been created, the earth with all its furniture, every living creature, and why no rain? Many thousands of years elapsed, and not a drop of rain! There was a sun, an atmosphere, and water; but the sun had not time to produce clouds. The sun was drawing up vapors for this purpose, the atmosphere was lifting them up, currents were coming, but had not yet reached this country, notwithstanding all the mechanical force of electricity and gravitation. Seed had been put into the ground that it might bear fruit; water was made to ooze from the earth to refresh and fertilize it; but the sun and seas had not time to prepare clouds, nor the air time to waft them. Most incomprehensible indeed that water did not fall till such a lengthened period after the creation of the earth, with all its furniture! Consequently, I could not, by any means, be the advocate of days meaning periods; first, from its being a contradiction of the sacred penman; and secondly, from its repugnance to scientific fact.

I now come to propose an objection before I develope my own sentiments. It may be asked, was the lower stratum made first. The series at the bottom, (there is no occasion to tell the technical phrase) consisting of rock and stone, did it fall first? They say it did. I inquire what is its weight? We take it up from the earth and try. The weight of limestone. Was gold found at that time above it? Was copper found? Was iron found? I am told they were. What was the reason that iron did not fall to the bottom?—it is considerably heavier than water. Why did not gold?—a body nineteen times heavies. Why not copper?—ten times heavier. Mercury?—thirteen times heavier; and all the other minerals. I should naturally expect that if the precipitate and deposite principle were in operation, such would be the case. Strange fact! a light substance at the bottom and a heavy substance at the top. How did these very heavy substances come there? They take care not to answer this query, but put forth

their system without its attendant objection. How did it happen that gold remained united with sulphur: can we on the principle of fusion suppose such a union without one being expelled? Till favored with a perfect solution of these points, I cannot espouse the theory under review. It is perfectly hostile to the doctrine of specific gravity, and to infallible truth itself.

Where were the materials of the secondary strata when the first strata were forming? Some say in the air, others in the water, and that they were gradually deposited. How came they to be in the air at an extraordinary height? Iron suspended in the air! That is the oddest thing in the world! Sandstone in the air! Coal composed of carbon and hydrogen, at such a height! Why not the hydrogen burn off? How came it to be so extremely rare; why did it not ignite when combined with oxygen? How so immense a quantity of minerals could be in the air is to me most mysterious.

But perhaps they were in the water. Learned men have asserted this—some living, some dead. I have a great respect for them; but I like to be fair, to give a system with all its difficulties, not suppressing a single truth. Muriatic acid dissolves iron; but how iron is dissolved in water I cannot conceive. Put some into water, and see will it dissolve. This may be a way for talking, but I can discover no principle in it. Where was the iron while the water was being formed? I find the greatest difficulty in getting a reply to the question.

The system is very violent. I am every moment repelled from receiving it. It is opposed to all knowledge of the principles of chemistry and natural philosophy. Retaining the notions of our opponents, plants were evidently not intended by the same beneficent power, for human or animal sustenance, on account of the sort of place where they were found. If they proceeded from the air, they had no soil to support them; if they were a precipitate, there was no conceivable principle on which they could grow. Then put a whole set of winds into activity, and what must be the result? Therefore, if the earth had been growing into strata, botany is against the system, and specific gravity against it. Greater and greater difficulties every moment occur. In propor-

tion as I study the principles of precipitates, I find renewed obstacles springing up into my path.

The tertiary strata next demand our notice, and here I have a most important argument. They consist of rocks composed of a great variety of materials, such as limestone, sandstones, clays, and sands, which abound with organic remains, altogether descending to the depth of one thousand and sixty feet. If these had been in the air, why not drop down along with the others? How is it that iron did not unite with carbon? Iron has a very great affinity for it. I am surprised it did not unite and form water. Affinities are united, and those would unite under ordinary circumstances. Where were the reptiles which we meet with in the tertiary strata, while such strata were in process of formation? If in the air they must have all been burned; if in the water, all suffocated. It is astonishing how men can make such a splendid flash. Very frequently it happens that the geologist is no chemist, just as the chemical man is no geologist, and both, therefore, in writing treatises fall into ludicrous absurdities. Who can know Scripture without studying it? A man who can thoroughly understand it, must be able to compare all the Eastern languages. Who can be acquainted with the principles and dogmas of theology without reading them? A mere chemist, or a mere geologist, without a knowledge of the Scriptures, to be bringing his opinions in collision with the infallible testimony, acts an exceedingly dangerous part.

I ask, and you will assent to the justness of the interrogatory, where was the moon all the time these deposites were making—the moon that causes three great whirlpools in our oceans? Can we conceive of any deposites she would not shake and agitate. Where was this satellite when stratum after stratum were falling over one another? What became of the furniture of the heavens all this time? Why were not these formations counteracted?

Further, are these crusts universally prevalent? Is there every where a primary strata; everywhere a secondary; everywhere a tertiary? How could these various deposites take place, and that in different spots and in such different places? Where could they come from to cover the earth, if the earth were originally a small

nucleus producing stratum after stratum? Out of the air? Out of the water? See the difficulty. If it be said they were merely local, I come in contact with my opponents, being able to account for them on that supposition. I will explain the phenomenon, not upon a new principle, but upon a better one.

But, previously allow me to ask, why are not similar strata making now? I wonder that they are not now forming, that we might give some historical evidence how they are made. No one attempts to account for them; none have been lately formed; science consequently stands in the way of their principles. And now I come to the causes which I assign for the diversified appearances alluded to.

Those with whom we are at issue have one universal principle running through their whole system. Wherever they perceive a variet y of ingredients entering into the composition of any body, they say it has been made in the process of time. Limestone is composed of carbonic acid gas, and lime; and water of oxygen and hydrogen gas. Will any one say that these ingredients were originally distinct, and afterwards made into water? Will any person presume to say, that everything existing in the aggregate form, existed once in an individual form? That because oxygen and hydrogen are found in the composition of water, seas were produced by a combination of these gases? This is a ruinous principle. As well might we say that living beings were created, in the same manner. God made man out of the slime of the earth, not by a conjunction of the many (not less than a hundred) primary ingredients of which the human body is composed, but in an instant. I deny, therefore, that God made everything first in individual principles, and then permitted the earth to unite and form them into compounds. I have the statement that seed was made, and that was a perfect compound, as much so as anything with which we are acquainted. Man himself was made by the immediate agency of Omnipotence, and why not every other material?

Unless strong reasons can be adduced to prove the universality of the strata, I cannot assent to its truth. Where do you find the strata referred to? Where the insects?—the fossil bones?—the very track of the little feet of the spider seen upon stone a thou-

sand feet under the surface? They have all become fossils. Where do you get them? They are got in the basin of Paris and the places formerly valleys. They are got up against mountains like the Alps. We get them enclosed between mountains, as in Switzerland and other countries, wherever we get stratified rocks. They are found at the sides of the mountains—the sides next the north in the northern territory, and those next the south in the southern territory.

How do I explain and elucidate the matter? I respond by tracing it to the universal deluge. Do not mistake my two positions. If our opponents assert that the whole earth was stratified, I say the stratification must have come out of the air or water; if it were local, I instantly reply, the flood must have caused it. A deluge filled up all the valleys, accumulating in its course more and more material, and as it swept upwards stratified the side of the Alps.

If any one ask me on what ground do I say this? I answer, on the ground that water enveloped the earth for so long a period. Think of water being five miles high—think of its coming as an expression of God's anger, and that for the space of three hundred days! Why, if a single river were directed under similar circumstances, to inundate the land, the effect would be wonderful: and will any one say that so great a mass of it as that introduced by the universal deluge, could not stratify mountain after mountain, insect after insect, and fill up all the valleys of the globe! My flood principle, then, is not hostile to reason or universal science.

Men ought to be persons of extensive education to give a fair and impartial description of what species of rubbish fossil animals consist. I have never been fairly answered on this point. But upon the hypothesis just advanced, how easily may we suppose fishes may be carried out, drifted in various directions and deposited, and shells to remain at the tops of mountains. Is there any thing more natural than that lions, as well as other animals, should be swept along and become embedded in the ice? Why, suppose that this region was originally tropical, the northern animals, such as white bears, have been got down in the torrid zone, and it is said that the inhabitants must have once had a

polar temperature; so great are the changes which the earth has undergone in different ages.

Animals in great variety are found in caves lying together in Warwickshire. We can very readily imagine that they were carried thither by the vast flood which flowed into all the creeks, and bays, and harbors of our globe. The earth is more than one half water. How is it that the land, which, in the estimation of the geologist, was lifted up from its place, has not equally subsided? Is there any cause? If so, such cause must operate uniformly, it cannot act inconsistently. Land, therefore, having been deposited, why was it not equally so in every place? Adopt my theory, however, and you may fill up valleys, throw down mountains too, and lay them in desolation.

But gentlemen on the opposite side, never think that it was the extreme violence of the inundation, in that awful catastrophe, which chiefly occasioned the extraordinary effects of which we have been speaking. True, say our opponents, stratification may occur in valleys, but how will you account for fusion? How do you account for it on your premises? By what sort of heat? heat of water, or that of air? I am told, by the combination of materials—chemical affinity! I cannot understand that. Upon my principles I can account for fusion. Is sea-water a compound of muriatic acid and soda? Muriatic acid is a great violent; it will melt copper, and a small quantity put on limestone would dissolve it in less than an hour. Let any one try, and he will see it melt like sugar. Then there is the salt principle yielding a large quantity of alkali; and all this falling upon a metal basis, the greatest solidification would take place.

Let my flood, therefore, go over the land, and it will bear along with it plants and living creatures, disperse them in all quarters, and arrange them in the most stratified order.

Monitorial Instruction.

" So much has been said, pro and con, with regard to the system of instruction denominated the mutual, or monitorial system, that by the request of numerous friends, we propose to discuss its merits somewhat farther, at the same time that we express our assent, that it has conferred benefit upon many a poor neighborhood. It has rescued thousands, we doubt not, from deplorable ignorance. By this system, one man is enabled to superintend an almost indefinite number of scholars, each scholar throughout the school depending on one of his fellows for nearly all the instruction he is to obtain. It is not proposed to inquire whether one child can teach another, but whether such a mode of communicating knowledge is preferable to any other, when parents are able to pay for educated instructors. It must be evident to every reflecting person that a teacher, or monitor, who can hardly be said to be in advance of his pupils, is not calculated to elicit the springs of intellect. He can never lead him step by step to an eminence, and point out to him a land of promise, or show him where "Alps on Alps arise." The only traces of mental discipline, or cultivation, usually found in a person who has been wholly subjected to this mutual process, are commonly a monotonous style of reading, and perhaps, a tolerable hand-writing, and some knowledge of arithmetic and geography. No delights for the paths of science have been inspired, and the mind is left much as it was when the education was commenced; except, perhaps, that it has become more confirmed in habits of indolence and vacancy. The writer of this, knows from his own observation, that such results do flow from a want of knowledge in the monitorial teacher.

Many judicious persons who have superficially looked into this system, have come to the conclusion that it must be excellent for instruction in the first rudiments of learning, but frankly confess that they cannot see how it is to be made advantageous in the higher departments of literature and science. There is a fallacy in this conclusion. The *wisest* patrons of the monitorial plan

have only contended that it was a feasible way of acquiring the indispensable parts of an education with the least possible expense.

The guidance of the mind's first steps, is unquestionably, the most important part of instruction. Hence it is, that virtuous and discreet mothers who are able to teach, have so often been blessed with the greatest and best of men for their sons. The subsequent operations of the mind are always more or less regulated by the manner in which its acquisitions were commenced. The mind which is thus strongly imbued at the outset in favor of the delights of learning, enters every successive field of exertion with avidity and pleasure, and ranges its wide extent without weariness or satiety. The fascinations of its first excursions have originated a zest for every new discovery that is to follow. As in classical studies the teacher who occasionally digresses a little from the tedious routine of construing and parsing, into the diverting legends of ancient story, interests and attracts the eager and youthful mind; so, and much more, must the teacher of the first principles vary and diversify his instructions, until every little listener shews by his attitudes, and the glistening of his eye, that he is pleased and interested. But these happy results are only to be looked for where persons of ability, who are accustomed to teach, are employed. It would be in vain, nay folly, to expect them in a purely monitorial school. How is it to be expected that an inexperienced and untaught child can teach? An opaque substance of any degree of polish may, indeed, reflect a portion of the light that shines upon it; but the minds of a considerable portion of the monitors in schools on this system, are commonly too rude and dark to reflect a single ray, and the principal of an overgrown institution of this kind, too much beclouded with the cares of government to communicate a ray, even to the monitor. It is, therefore, a system without a sun, where the only light to be enjoyed is what the learners mutually afford each other by the kindling of their own unguided geniuses.

Persons unversed in the susceptibilities of the infantile capacity, as all children are, can never inspire in their equals a desire of knowledge for its own sake, because the monitor has no power of

exemplifying its charms; and unless such desires are awakened, learning will never become the chosen pursuit of any one individual. Hence, again, the necessity of a wise and experienced teacher to guide in the incipient, as well as in the advanced stages of learning. Does a parent realize that his son's time would be worse than wasted in acquiring a corrupt pronunciation, or an inelegant, or erroneous method in any science, let him see that his son or daughter is under the immediate instruction of a well-educated and competent instructor. It is next to impossible to guard against the common errors and vulgarities of the day, so long as the teacher and taught are equals. Respect for rank is conservative in morals; and that which is communicated with some authority is more appreciated by young learners.

Any nice observer must readily see that there are many incidental evils unavoidable in the system of mutual instruction; nor can it be supposed that it is possible that boys whose attainments are pretty nearly equal, can mutually refine, expand, and liberalize each others' minds. What the one knows may become common stock, whether it be knowledge or vice; and although they may acquire thus, at a cheap rate, something that is useful, yet we appeal to the good sense and guardian affection of parents, whether there is not imminent danger of their children suffering a mental deterioration that shall more than overbalance what is to be gained from a class-mate monitor.

But it may be said that the subject has been discussed dogmatically, and without anything practical by way of illustration. Let us endeavor, therefore, to combine a little practice with our theory. It is often said that the excellent public schools of the city of New York are monitorial. At present, this is but partially true. In their origin some of them were so, but in the practical workings of the system, it has been revealed to the most obtuse among the managers, that it was susceptible of improvement. Accordingly, while some show of defence of a waning system is kept up, its bulwarks are allowed to decay and fall into dilapidation before age has made them venerable. These schools, under their able and accomplished teachers, have receded so far from the original plan of mutual instruction, that they bear but a faint

resemblance to the schools of Joseph Lancaster. Instead of 400 or 500 scholars in one room, under one teacher whose literary qualfications are unvouched for, with one monitor of order, the school consisting of nine classes, the school evolutions directed by telegraph, the writing done in sand, and only reading and common arithmetic taught; they have now schools averaging abont 250 taught by four instructors—with a little more than half the number of scholars, they have twice as many teachers. Two recitation rooms provided for each school, instead of none; and all the lower classes sent down to be taught in a primary school; new, and more liberal studies introduced; and the higher classes taught almost exclusively in the recitation rooms by educated teachers. All this is well; it is a concession to enlightened public opinion, called for by the progress of the age. It is at length seen that a monitorial school is a splendid, but cumbrous machine, attracting the gaze of stolid admiration, but sadly lacking energy in its motive power. That the men, even of this inventive age, have not yet found out any system of moral mechanism, by which virtue and knowledge are to be transfused as if by spontaneous circulation;—that cheap ways of teaching are not generally economical.

The primary design of education is to expand and liberalize the mind, to bring into action its latent energies, and form habits of thinking and acting, that shall adorn and elevate the learner. But these exalted objects cannot be accomplished if the young mind in its first aspirations, is defrauded by a perverse system, or by an inadequate teacher. If the youthful faculties are lulled asleep by a systematic process that gives but a smattering—a semblance without a reality, it is ten to one that they never will be so aroused as to be capable of original thinking, or re-acquire that habit of mind which was lost for the want of an *education*, and which is necessary to the attainment of eminence in either science or literature.

From the American Eagle.

ALGONAC.

A CHIPPEWA LAMENT.

ON HEARING THE REVEILLE AT THE POST ON ST. MARY'S.

From dreams short and broken, prophetic and high,
I wake in my cabin, to ponder and sigh!
I think on the days when transcendently blest,
My forefathers revelled, the lords of the west,
And fired by ambition, or valor severe,
They winged the dread arrow, or brandished the spear.
I think how their wisdom, their valor, their might,
Prevailed in the council, the chase, or the fight;
And I sigh to reflect, all depress'd, and o'ercast,
Those ages have vanished—those glories are past!
But hark! from those battlements bristled with steel,
What sounds o'er these woodlands so heavily peal?
Now rolling—redoubling—concussive and clear,
Now striking with sharp-killing notes on the ear;
'Tis the signal of day for the soldier. To him,
There is a joy in the music, no tears ever dim,
It speaks to his feelings—his habits—his pride,
More keenly than all human language beside.
But me—far, far different feelings oppress,
It strikes on my ear like the note of distress.
Ah! how can those sounds please my kindred, or me,
Which remind us our nation no longer is free?
My fancy reverts to the moments so bland,
When my own native music prevailed in the land,
And my fathers danced blithe on the oak-covered hill,
Remote from the white man, and all his proud skill.

Day breaks in the east! but its glimmer no more,
Lights hope in our bosoms, or joy on our shore;—
Ah, why should its beams more illumine the cot,
Where the war song is mute, and the war song forgot!
Where the bow and the arrow, the spear and the mace,
Gleam no more in the battle, or ring in the chace!
Ah! why should not heaven, kind heaven, resume
Its primitive darkness, and shroud me in gloom?

Oh fly, ye bright streaks that bedapple the morn,
Nor shine on a mortal so sunk and forlorn!
The beauty of day I no longer can see,
Night—midnight, alone is congenial to me.
Ye birds, cease your warblings; my heart cannot bear,
The joys that so thrilled it when fortune was fair;
And roused by the combat, or led by the chace,
I roved unconfined through the regions of space,
Tracked the deer from his covert, the wolf from his den,
Or rushed to the charge with the noblest of men.
O teach me! ye wise men who boldly survey,
The causes that hasten my nation's decay;
Come, teach me to smile on the beauties that lie
In the bright vernal landscape, or the red evening sky,
While pining in want—by misfortune oppressed,
The scorpion, slavery, is gnawing my breast.

*Wabishkizzy** may smile, *Wabishkizzy* may say,
I will teach you to read, I will teach you to pray.
But say, when our arts, manners, customs, are lost,
What then shall we cherish, what then shall we boast?
When the war flag is struck, and the war drum is still,
And the council fire glimmers no more on the hill:
Can we feel any pride, but our forefathers' pride,
To live as they lived,—and to die as they died?
They tell me, that blessings for me are in store,
The sages—saints—poets—philosopher's lore,
The comforts that labor and science bestow;
The loom and the compass—the sickle and plough!
But, ah! can they tell me where joy shall abide,
Without national customs, or national pride?

And here my grief presses—these ramparts so high,
White—white as the summer cloud floats in the sky;
These walls but remind me how cruelly cast
My own native woods are encompassed at last.
In vain 'tis averred, with no hostile design,
That in guarding their country they tranquilize mine,
But whenever I look on the cannon-pierced walls,
A fearful sensation my bosom appals.

* White man.

Wherever I see on these once happy grounds,
The sentinel pacing his limited rounds;
Or borne down the stream with the low evening hum,
Or hear the loud notes of the deep-rolling drum,
I start from my visions—I cannot but see,
My nation, my nation, no longer is free!
That all this long muster of cannon and steel,
Tho' prudence may sanction, deny, or conceal,
But gleams o'er the war-path that leads to the grave,
Their object to conquer, destroy, and enslave.

Thus roused from his slumber, proud Algonac sung,
A wild native melody dwelt on his tongue;
Then folding his robe, he sank back on the plain,
And courted his dreams, and his slumbers again.

DACŒMTAS.

Origin and Progress of Arithmetic.

The antiquity of the science of numbers, no one will be disposed to doubt. Some knowledge of numbers seems to be indispensable in the rudest condition of society. But in the earliest ages, when great simplicity prevailed, when property was much enjoyed in common, the science of numbers made but small progress. When individual property became an object of desire, and commerce began to be established as a regular pursuit of man, the art of numbering and recording the same, became necessary. The extent, style, and degree of accuracy, adopted in the antidiluvian arithmetic is, no doubt, irrecoverably lost; but it may fairly be inferred, that a ship carpenter who had skill enough to build the ark, must have had some system of arithmetic and mensuration.

If the Phœnicians were the first merchants of any distinction after the flood, it is probable that mercantile arithmetic owes something to them. From these, commerce and arithmetic were carried into Egypt; and history justifies us in saying that great improve-

ments were made in the science of numbers, and they originated, so far as we can learn, the science of Geometry. Considerable advancement was here made in Arithmetic; and here, also, was probably begun the first mystical application of numbers to the affairs of human life—to the virtues—to the soul—to the divinities—and to almost everything else; in short, for every purpose divine and human, they seem to have had some symbol, or representation in numbers.

From Egypt, this knowledge, and many of these superstitions, passed into Greece, where improvements and additions were made; especially to the mysterious parts, much of which may be seen in Plato, in the life of Pythagoras, by Jamblichus, and in the commentaries of Boethius' Arithmetic. We have now reached a country and a people, where we may look for acuteness and method; and first, we find a regular system of notation; and then upon this, a system of computation; and after this, an inquiry into the relations and properties of numbers. The Greeks, Hebrews, and other oriental nations, used a notion by the letters of the alphabet. The Greeks had two methods. The first was nearly the same as the Romans; something of which is generally understood as, I=1 V=5 X=10 L=50 C=100 D=500 M=1000, &c. Afterwards, they had a better method; in which, the first nine letters of the alphabet represented the first nine numbers, and the next nine represent any number of 10s, any number of 100's by other letters and marks; and in this way, they went on with *thousands, tens of thousands,* &c.; and thus they made a near approach to the Arabian notation, as it is called, now in use. But, notwithstanding all the adroitness and skill of the Greeks, the process of the multiplication of large numbers into each other was quite a difficult and complicated operation, which was never entirely overcome until the reception of the present notation, and decimal arithmetic. The Arabs received our almost perfect system of notation from India. How long it had been in India before it was received in Arabia, is not now known. One thing is quite certain, however; it was not known to the learned Greeks and Romans. Vossius informs us that the first Greek writer who

wrote a treatise on arithmetic according to this notation, was Maximus Planudes, who wrote about the year A. D. 1370. This was after this system had been generally received in Europe. It is said the Moors brought this notation into Spain, whence it spread into the different countries of Europe. Vossius thinks this new method was brought into Spain about the year 1250; but Dr. Wallace asserts it was as early as 1000.

Our numerical figures differ, in form, a little from what the Arabians use, yet the art of computation still remains the same.

Having carried the history up to this point, it may, perhaps, be well to go back and remark a little more upon the kinds of Arithmetic which were among the ancients. The oldest system that has come down to us with any degree of perfection, so far as regards science, is developed in the seventh, eighth, and ninth books of Euclid's Elements; in which he gives us very fully the doctrine of proportion, and that of prime and composite numbers. Next, we have an account of (though we have not seen the work) a treatise on the theory of arithmetic, by Nicomachus, who wrote on the classes and distinctions of numbers, into such as plain, solid, triangular, quadrangular, &c., which were termed figurate numbers,—of odd and even numbers.

The first system of arithmetic extant on the present notation, is by Jordanus, who flourished early in the 13th century. This work was altogether on theory, and contains most that was valuable, with regard to numbers, in Euclid and Bœthius. This work was called the *Algorissmus Demonstratus*. It is said that the manuscript of this work is in the library at Oxford. Lucas de Brugo, an Italian, wrote a treatise in the year 1499, which Doctor Wallis very highly commends as both theoretical and practical. The first complete practical arithmetic, according to the present notation, was written by Tortaleu in 1556. After this, treatises multiplied apace. The most distinguished in Europe who wrote before A. D. 1600, were: in France, Clavius, and Ramus; in Germany, Stifelius, and Henischius; in England, Buckley, Diggs, and Record. Ramus used the decimal periods in the extraction of roots; but the first who wrote a treatise on decimals, was Simon

Stevinus, about 1582. Dr. Wallis is the first who treated of circulating decimals. One of the most brilliant inventions ever made in arithmetic, was the facilities given to computation by *Logarithms.* The world owes this to Lord Napier, baron of Merchiston, Scotland—about the close of the 16th century.

Dr. Wallis is the earliest author on the arithmetic of infinites. But the grandest consummation is to be found in the universal arithmetic, known also as analysis, or algebra. This method of calculation was brought into Europe about the same time with the common arithmetic just spoken of, and probably by the same individuals.

(*To be continued.*)

A Brief History of Schools in New-York.

The early settlers of New Amsterdam were not ignorant of the advantages of schools. Scarcely had a town sprung up, large enough to support a school, before it was established. They did not, however, like the Plymouth settlement, bring their schoolmaster with them, but, as early as the year 1633, we find that Mr. Adam Rolandsen, opened a school in what is now the City of New York, and nine years after a school was opened in Albany, under the patronage of the patroon, Van Rensselaer. Early provision was made for schools in all the principal Dutch settlements.

The first Classical and English school was opened in the city of New York, under the patronage of the English colonial government in 1687. This school received fifty pounds a year, from the government, for the support of a teacher. In it were taught Latin, Greek and Mathematics, and forty pounds were allowed for the purpose of establishing free scholarships, which privilege was to be equally enjoyed, according to population, by the different counties in the colony. This was the germ of Columbia College, which was incorporated in 1754, and endowed by money raised by lot-

tery, under the name of King's College, which name it retained until after the revolution. After the close of the revolutionary war, whence was the occasion of a temporary suspension of this Institution, lands were granted in the several townships for the support of common schools, and to establish a literary fund. Numerous public functionaries had, from time to time, recommended a system of common school instruction, and in the year 1795 a common school system of the state was established. The demoralizing influences of a seven years war had operated disastrously upon the schools of the city and state, and a large portion of men and women just coming upon the stage of action, were very imperfectly educated. The Dutch language was principally used in the old settlements, and there were prejudices against the innovations and fashions of their eastern neighbors, and the schools were generally taught by foreigners, many of whom were destitute of all the qualifications of a good teacher. In 1797 the schools in the city of New York were not on a very magnificent scale, either as it regards their accommodations, or the branches taught in them. Columbia College was then, as now, a respectable institution, but the number of its students has never been large, owing, probably, to the prevailing opinion that the distracting influences of a great city are uncongenial with academical pursuits, This opinion, both in the city and the surrounding country, has operated, so far as numbers are concerned, against the prosperity of the college. The heavy expense of supporting scholars at board, compared with the respectable private boarding schools in the neighboring villages, which have usually drawn large numbers of both boys and girls from the respectable families, checked for many years the prosperity of the city schools, and kept them in the hands of mere adventurers. Schools were of a low grade, and charged low prices; there being no public free schools, tuition being generally from two and a half to four dollars a quarter. In the year 1797 there was but one school in the city that charged as high as seven dollars a quarter, and that was Malcolm Campbell's classical school. Says the venerable Albert Pickett, senr., now of Ohio, "I commenced teaching in the city of New York in the

spring of 1797. At that time there were, I believe, but four American-born teachers in the city, and they were Jacob Brown, (afterwards Gen. Brown,) Benjamin Romaine, Enoch Ely, and John Coffin. In 1798, there was but a very limited and superficial course of instruction in the common schools. The books used in schools at that time were Webster's American Spelling Book, the American Preceptor, by Caleb Bingham, Dilworth's Arithmetic, and Theodore Dwight's Geography. There was no such thing as a large Map, an Atlas, a Globe, or a Blackboard, in one school in a hundred. Morse's Geography made its appearance about this time, and I claim to be the first who introduced it into a school in the city of New York. Soon after this, I procured a set of Guthrie's large Maps and a pair of English Globes. This brought some ridicule upon me, in which even teachers joined, saying my ambition was such, that I was trying to make a college of my common school. To this gentle indictment, Mr. P. seemed rather disposed to plead guilty. It was not, however, his own school alone that he desired to raise, but the whole educational platform of our state and country. And this process of elevation has been gradually going on ever since the commencement of the present century. The present system of common school superintendance may, perhaps, date back as far as 1812, when Gideon Hawley was appointed superintendant. The schools, notwithstanding the smallness of their receipts, from the distribution of only $110,000 a year, gradually conformed to system, a demand for better teachers and better books called them into being, and, in 1838, when the annual increase to the sum to be distributed, of $195,000 from the United States deposit fund was made, the schools were generally in a condition to profit by this addition to their annual dividend. Teachers in various parts of the State have caught the spirit of our venerable friends in Ohio, and have inserted *Excelsior* upon their banners. The District Schools, now numbering over 11,000, are generally supplied with teachers, either male or female, for eight months in the year; many of them are taught eleven months; but the average, as appears from the superintendant's reports, is only about eight months. The city of New York, Albany,

Troy, Buffalo, Brooklyn, Williamsburgh, Poughkeepsie, Hudson, Utica and Schenectady, have for municipal and local convenience, separate systems of management and control.

The Literary Fund, which is quite distinct from the Common School Fund, is under the management of the "Regents of the University of the State of New York." This board consists of twenty-one, (who, with the exception of the Governor and Lieutenant Governor, who are *ex officio* members), are elected by the Legislature. The University of the State of New York includes, therefore, all the Institutions that are entitled to shares in the literary Fund of the State. The Literary Fund is invested principally in stocks, and yields an annual revenue of 75,000 dollars. 40,000 of this is apportioned equally to the use of the eight Senatorial Districts, for the benefit of their respective Academies. The balance goes, 10,000 to the State Normal School; 9000 to the University of the City of New York; 7000 to Geneva College; 3000 to Hamilton College, &c.

There are four incorporated Institutions, which are termed Universities in this State, viz: the University of the City of New York; the Madison University in Hamilton, Madison County; the Rochester University, and the Buffalo University. We think the word University applied to many Institutions in our country is a misnomer.

There are also four Colleges; Columbia College in New York; Union College at Schenectady; Hamilton College at Clinton; and Geneva College at Geneva.

There are five Medical Schools, viz: the College of Physicians and Surgeons in the City of New York; the Medical Department of the University of the City of New York; the Albany Medical College; the Medical Department of Geneva College, and the Medical Department of the Buffalo University. There are also 179 incorporated Academies in the State. There are also 15 or 16 Female Seminaries of high reputation, also 9 Theological Seminaries, viz: two for Presbyterians, two for Methodists, one for Episcopalians, one for Baptists, one for Lutherans, one for Associated Presbyterians, and one for Roman Catholics. There are also seven or eight Collegiate Schools in the State, which

are not incorporated; so that in the Academies, Colleges, Normal Schools, Medical, Theological, and other High or Collegiate Schools, there are, at least, in the State of New York, 30,000 students enjoying their benefits. Add these 30,000 to the 742,000 children in the Common Schools, and we have 772,000 who are connected for some portion of the year with some school or seminary in the State, so that one-fourth of the population of the State are at study for some portion of the year. We very much doubt whether this can be said of any other State in the Union.

The Requisite Qualifications of an Instructor.

1st. He should have uniformity of temper.

2d. Ability to discriminate character.

3d. He should possess decision of character.

4th. He should be kind and affectionate.

5th. He should be governed in his actions by a consideration of his high moral obligations.

If he have these preliminary qualifications, let him then acquire the necessary learning, and he will be a good teacher. But how much learning is necessary to constitute a good, well-qualified teacher?

Passing over many topics connected with those already mentioned, I shall now proceed to remark on the necessary literary qualifications of a schoolmaster. It will at once be apparent that no one is qualified for this business who has not a thorough knowledge of the branches required to be taught in common schools. These are Reading, Writing, Grammar, Arithmetic, Geography, and in some States, the History of the United States. All these branches are necessary to enable individuals to perform the common business, and common duties of life. The four first, are requisite in writing a letter on business, or to a friend. The fifth is required in the business transactions of every day. The

two last are necessary to enable every one to understand what he reads in the common newspapers, or in almost every book which comes within his reach. Of each of these branches the instructor should certainly have a thorough knowledge; for he ought to have a full knowledge of what he is to teach. As he is to lay the *foundation* of an education, he should be well acquainted with the first principles of science. Of the letters of the alphabet, such disposition has been made as to produce an immense number of words, to each of which a distinct meaning is given. "The nature and power of letters, and just method of spelling words," should be very distinctly understood. If there be defect in knowledge here, there must be a defect in teaching. A man cannot be expected to teach that which he does not know himself. Among all the defects in the literary qualifications of instructors, the most common, by far the most common, have been here. Among a great number, both of males and females, there are *very few* who possess the requisite knowledge of the nature and power of letters, and rule of spelling. The defect originates in the fact, that these subjects are neglected after childhood, and much that is learned then, is subsequently forgotten. Teachers, afterwards, especially of academies, presume that these subjects are familiar, and seldom make the inquiry of such as are qualifying themselves to teach, whether they have sufficient knowledge on these points. As a considerable part of every school is composed of those who are learning to spell and read, much importance is attached to the requisite qualifications of the teacher, to lay a proper foundation for subsequent attainments.

Every one who teaches school ought to be eminently a good reader. The habit of reading, early formed, often continues through life. It is not to be expected that a child will learn to read with correctness and ease, without being well taught. Nor can it be expected that one will teach well, who does not know how to read with propriety. Hardly anything is more difficult than to correct a bad habit of reading, especially where it has been continued for several years.

The value of the art of reading well, is discussed by Dr. Por-

ter, in his Analysis of Delivery. He remarks that, "in this country, where literary institutions of every kind are springing up, and where the advantages of education are open to all, no one is qualified to hold a respectable rank in well-bred society, who is unable to read, in an interesting manner, the works of others. They who regard this exercise as a polite accomplishment, merely, forget to how many purposes of business, of rational entertainment and religious duty, the talent may be applied. Of the multitudes who are not called to speak in public, including the whole of one sex, and all but a few comparatively of the other, there is no one to whom the art of reading in a graceful and impressive manner may not be of great value." To the teacher of children this is an acquirement of very great importance; and no one is qualified to engage in teaching, till he is able to read well.

A thorough knowledge of Arithmetic is also indispensable to the schoolmaster, and some acquaintance with Algebra, Geometry, and the Natural Sciences. To be able, by the aid of rules and manuscripts, to solve the question given, is very far from being the knowledge necessary. No one is properly qualified in this branch of science, until able, from his own knowledge of its principles, to originate rules, even if they were not given in his book. He should be able to tell the "why and wherefore" in every operation, else he is not prepared to teach. The pupil will derive but little practical benefit from the study, and every process will be mechanical. As this science is necessary in every condition of life, as it is to be used almost every day in our lives, great importance should be attached to the mode of teaching it. Mr. Parkhurst justly remarks, "it is the practical utility of any branch of knowledge that gives it its chief value. The difference between the practical utility of the various branches of knowledge is very great." A knowledge of the nature, power, and combination of numbers, whether we regard its effects as important to mental discipline, or its use in the business of life, must be considered among the most important acquirements.

The instructor is expected to teach Geography; and of course he ought to understand it well himself. This science is very

interesting and useful, and is studied in nearly all the primary schools. The treatises on the subject, which have been written within a few years, have done something to facilitate the study, and lighten the labor of the teacher; but no book can supply the place of the living instructor. He ought to be able to make the study more practical than it is possible for any book to make it, however well written. The scholar may learn many interesting facts in Geography without the aid of an instructor; but this will not render it proper for one to attempt to teach without a thorough and connected view of the whole science, and without being able to explain what is doubtful, and illustrate what is obscure.

English Grammar is made a study in all our district schools, and is a very important branch of knowledge. It is that which teaches how to speak and write correctly. If it be an object, then, to be intelligible in conversation and writing, it is certainly important to be well versed in this science. But many have overlooked the proper definition of grammar, and while professedly attending to it, have neglected nearly everything but syntax. To learn to apply the common rules of syntax to the written language, which we find in some books, is what is commonly regarded as learning grammar.

But this has certainly little claim to be called the study of grammar, which should always be explained as the study of language. There are several things besides mere syntax, which are important. One may have ability to parse the words in a sentence,—may be able to apply rules, rather by habit than otherwise, and yet know but very little of language. As in arithmetic, so here the teacher who is properly qualified, should be able to originate rules, and to illustrate those principles on which they are founded. If he is not able to explain the propriety of the division of language into parts of speech,—if he is not able to exhibit the reason of the names applied, and the divisions which are made, he is not able to benefit those materially, whom he is to instruct. The great deficiency, which has been observed in the qualifications of many in this branch, makes it proper to dwell longer upon it. Owing to this, many scholars have imbibed so strong preju-

dices against the study as to engage in it with great reluctancy, or neglect it entirely after having devoted some time to it. Hardly anything is more common than to hear it denominated a dry study, while it is a fact, that if properly taught, scarcely any study is calculated to excite more interest. Instructors should be well acquainted with their own language, in order to inspire a love for the study of it in their pupils.

A requisition recently made in some of the States, is, that the civil and political history of the United States should be made a branch of study in common schools. This is certainly very just. Every citizen of a republic, has a deep interest in knowing the history of the country that he calls his own. He ought to know by what means its civil and religious institutions have been established. He ought to be familiar with the obstacles which his fathers found and surmounted in achieving the blessings of civil and religious freedom which he enjoys. The name of his country's benefactors ought to be indelibly engraved on his memory. Love of country may thus be inspired. A knowledge of many facts in our country's history must be very limited, after its most interesting times shall have gone by, unless the history of these great events is taught in our primary schools. Very soon, all the hoary-headed patriots who lived and acted in those "times that tried men's souls," will have passed away. Instructors, therefore, should be qualified to teach history, and to interest their scholars in it. This they cannot do without a knowledge of it themselves.

History is the "school of politics," and in a government like our own, it is necessary that every freeman should in some sense be a politician.

With a knowledge of the above subjects, the teacher may be enabled to answer the *letter* of the law. But some other branches are requisite, in order that he may be *properly* qualified to engage in directing the studies, and disciplining the minds of the young. Intellectual Arithmetic, the Constitution of the United States, and of the State in which he lives, Rhetoric, Natural Philosophy, Chemistry, Moral Philosophy, Botany, Physiology, &c. By attention to Intellectual Arithmetic, he will gain a habit of originating

rules, by which he will be able to explain the reasons of the operations in written arithmetic, and exhibit to his pupils the process by which an answer is obtained.

Annual Meeting of the Association of Teachers of the State of New York.

The attention of teachers, and others interested in education, is respectfuly invited to the meeting of the Association of Teachers of the State of New York, which is to be held in the city of Rochester, on Wednesday and Thursday of the second week in August next. A meeting of much interest is expected. Many subjects for Reports have been proposed. The following committees have been nominated, and received the assent of such of the Executive Committee as I have been able to consult; and several of the topics proposed for consideration have been referred according to the appended programme. It is requested that such members of the Executive Committee as have not been seen and consulted, will make freely any suggestions, either with regard to the committees, or the subjects proposed to be reported on, as may to them appear best, in order that such amendments, or additions, may be made as the greatest good of the profession, and the public interests in regard to education may seem to demand.

JOSEPH McKEEN,
Chairman of the Executive Com.

COMMITTEES.

1. *On the Teacher's Profession.*—L. Hazeltine, of New York; S. W. Clark, of East Bloomfield; and Wm. Barnes, of Rochester.

2. *On the best mode of teaching Reading.*—M. Hagar, of Montgomery; B. F. Cook, of Wyoming; W. C. Howe, of Westchester.

3. *On Vegetable Physiology.*—S. B. Woolworth, of Cortlandt; W. W. Pew, of Tompkins; and F. Cooper of Onondago.

4. *On Natural Sciences.*—Wm. Hopkins, of Cayuga; W. H. Scram, of Onondago; and J. H. Partridge, of New York.

5. *On Ventilation, and warming Rooms.*—J. W. Bulkley, of Albany; Mr. Nicolls, of Madison; Mr. Wilson of Rensselaer.

6. *On Elocution and Reading.*—Professor H. Mandeville, of Oneida; W. Bloomfield, of Onondago; and N. P. Stanton, of Ontario.

8. *On Moral Instruction.*—E. M. Rolls, of Broome; William Barnes, of Monroe; M. Swift, of Ontario; W. M. Hough, of Westchester.

9. *On Reformatory Schools.*—O. Morris, of New York; E. G. Perkins, of Oneida; J. B. Glendenning, of Kings.

10. *On Emulation in Schools.*—W. Kenyon, of Alleghany; J. G. Hathaway, of Wayne; H. Harris, of Saratoga.

11. *On Female Teachers; their usefulness, qualifications, and compensation.*—Emma Willard, of Troy; Elizabeth Oram, and Eliza Robbins. of Mew York.

12. *On the Prussian School System.*—R. S. Cooke, Thomas Foulke, S. St. John, and S. Jenner, of New York.

13. *Union Schools.*—N. Britton, of Wayne; D. Cruttenden, of Montgomery; and Mr. Peck, of ———

It is expected of the chairmen of the several committees, that they communicate with their associates, so as to secure the preparations of the several Reports asked for before the meeting of the Association.

Lectures may be expected from J. N. McElligott, of New York; the Rev. Dr. Nott, of Schenectady; and others.

☞ The Poetry in this number is from the pen of H. R. Schoolcraft, Esq., whose acquaintance with Indian character enables him to mingle the realities of the life of the solitary and nomadic man of the American woods, with the fancy of his cultivated muse. It was furnished as a contribution to the American Eagle Magazine, edited by three youthful gentlemen of promise, who go *con amore* into the periodical business.

Notices of Books.

A Comprehensive Lexicon of the Greek Language, adapted to the use of Colleges and Schools in the United States, by John Pickering, LL. D. &c. Published by Wilkins, Carter & Co., Boston, 1847.

When a shorter process of attaining an end is devised, the wonder generally is, that the means had not been observed or found out earlier,—that men should be so blindfolded and obtuse that they did not discover the process many years before. When a thing is once done, the means of doing it appear simple; and the most difficult combinations, involving the highest reaches of intellect, become in a short time axioms on which to base higher stages of progress. The history of the improvements on the steam engine will aptly illustrate this remark: being rude and simple at first, it has gradually advanced, until its power and application now excite our wonder and astonishment. So it is with printing. The characters impressed on the bricks found on the supposed site of the ancient Babylon, and the metallic stamps used in early ages by the Romans to mark their various articles, have, by the invention of paper, advanced to the splendid condition in which we now find that useful and wonderful art. Such is also the history of education, which could hardly be said to take its place as one of the arts of life, until books were produced at a cheap rate, and became attainable by persons of ordinary fortune. It has gradually advanced, like other arts, by the appliances and devices of ingenious and learned men, until we now see schoolboys in age, discussing abstruse mathematical truths, and scanning the paths of the heavenly bodies. And fortunately it is for the advancement of knowledge, that easier plans for the communication thereof have been devised. Science is now spreading her wings, and Natural History, in its various departments, is claiming more time and attention than could possibly be spared by the old cumbering, time-destroying methods of teaching the dead languages, formerly in use.

The work under consideration holds an eminent place as one of those devices alluded to above. Its first publication in 1826,

was an important era in the history of teaching the Greek language, when it was finally freed from the Latin trammels by which it had been so long shackled. The Latin language, from its majestic and solemn character, and from its deficiency in flexibility, is exceedingly ill adapted for a medium of explaining or interpreting words. "That we should have so long," says the editor, "continued the practice of studying the Greek language through the medium of the Latin, seems the more extraordinary, because in the case of the modern languages, we always begin our studies with dictionaries explained in our own tongue; nor should we think it practicable in any other way to master the niceties and peculiarities of a foreign idiom. Who would sit down to the study of French, or Italian, or German, with dictionaries written in Latin,--and yet what essential difference can be imagined between the proper methods of studying a modern and an ancient language? For our part, we can entertain no doubt, that one principal reason why Greek is so much less familiar to us than Latin, is the circuitous and awkward practice of studying it through the medium of a third language; and that, a language into which it is impossible to transfuse the spirit, or the idiomatic peculiarities of the Greek, and which, in itself is more difficult of acquirement.

The plan of the present work was projected as long ago as 1814, but for various reasons was not published until 1826; and about two years after, a second edition appeared considerably enlarged and improved. Though originally based on Schrevilius' dictionary, for the purpose of obtaining a list of the words used in the authors generally construed in schools and colleges, the editor, however, did not content himself with merely translating the Latin interpretations found in that work, but mostly, rendered the English explanations from the original Greek. More copious significations were also given, and a greater degree of precision assigned to the general and ambiguous expressions which too often characterized the original.

In the edition now before us, that of 1847, the work has been, greatly enlarged and improved, containing the entire vocabulary

of the last edition, and that of Liddell & Scott's smaller Lexicon, and also of Professor Dunbar's Greek and English Lexicon, published at Edinburgh in the year 1843. With the help of this work, the student is enabled to construe the New Testament, and Septuagint, Homer, Xenophon, Thucidides, the Orations of Demosthenes, the Tragedies of Euripides, Sophocles, and Æschylus, the Comedies of Aristophanes; in short, all the works usually read at schools and colleges. It contains, in alphabetical order, the oblique cases, and the unusual forms of irregular nouns, adjectives, and pronouns, and the principal tenses of irregular verbs; and is thus well adapted to supply the wants of beginners. On comparing it with Donnegan, Jones, Liddell, and Scott's smaller works, the preference must be given to Pickering's. The definitions appear to be more methodically arranged; the primary significations being first given, then the metaphorical in the order of nearness to the first meaning, followed by the idiomatic expressions, which are, in general, very happily translated. The quantities of the doubtful vowels are also marked with much care and accuracy, affording a great service to younger students. The article, the conjunctions, and prepositions, which in the Greek language are so important in giving force and elegance to the expression, are treated with great fulness and clearness. The publishers have also done ample justice to the work, having printed it on superior paper, with a very clear and distinct type. Such are the claims of this work; suffiicient, we think, to give it a preference to any Lexicon of the same size now before the public.

A Complete System of Latin Prosody, for the use of Schools, Colleges, and Private Learners, on a plan entirely new; by Patrick S. Casserly, formerly Principal of the Chrostomathic Institution, and author of "A Translation of Jacobs' Greek Reader," of "A New Literal Translation of Longinus on the Sublime," &c., &c.; second edition, revised and improved. New York: Wm. E. Dean. 155 pp. 18mo.

The publisher has furnished us with a copy of the above-mentioned work, and after bestowing on its perusal as much attention

as our avocations would allow, we have no hesitation in saying that it literally fulfils the promise held out on the title-page.

From the simplicity of its plan, the judicious arrangement of its parts, the skilful gradation of its development—commencing with the easiest, and advancing step by step to the more difficult, and the clearness of its various details, we regard it as one of the most useful class books on the not very attractive subject of Latin prosody, yet published in America. The plan, or idea, of exemplifying the rules and exceptions, whether by single words only, by promiscuous examples, or entire verses, without anticipating any subsequent rule or exception, strikes us as one of great importance in the study of any branch of science or literature; particularly that of Latin poetry and versification, the most symmetrical and harmonious in the world. We do not always find this necessary gradation observed in educational works.

Section II., treating of accent, and Section IV., of pronunciation, although concise, are conclusive on these two subjects. The author's reasonings and remarks on the proper mode of pronouncing the long Latin vowels, appear both just and judicious; for we have often thought it not only absurd, but anomalous, to pronounce these vowels according to two different systems: i. e. the long *a*, according to the English; and the long *i*, according to the Italian.

The gross impropriety of endeavoring to read Latin verse under the trammels of laws imposed by English accent and quantity, is exposed with much tact by the author, at pp. 5, 42, and 94.

In the Supplement, and Exercises for the recapitulation of the whole, are very appropriately given examples not only of Hexameter, but also of Sapphic, Trochaic, Iambic, and Anapestic. In Stirling's Rhetoric, added as an appendix, the student will find a useful compendium of the tropes and figures used in composition, whether classical or English.

Introductory Geography, designed for Children, illustrated with 126 Engravings, and 20 Maps: by Boswell C. Smith, A. M. New-York: Cady & Burgess, 60 John-street.

The amount and diversity of information, the simplicity and adaptation of style for the purpose intended, and the numerous

and beautiful illustrations in this little volume, make it one of great attraction to youth, and we are not surprised to see that it has already reached a *fifth edition.*

Geography of the State of New York, embracing its Physical Features, Climate, Geology, Minerology, Botany, Zoology, History, &c.; by J. H. Mather, and L. P. Brockett, M. D. Hartford: J. H. Mather, &c.

This work is on a new plan, with county maps. It embraces the natural features, as well as much of the natural history of the State. The writer seems to have had access to authentic documents, both with regard to the early settlement and civil history of it as a Dutch colony; and also, to the documentary history of the great internal improvements, and geologocal survey, in which the State of New York was somewhat in advance of her neighbors. This work evinces more investigation, and riper scholarship, than we have seen in any similar work on a single State, intended to be used in schools. It is also acompanied by a very large outline map, and contains a great deal of information, valuable to the student of the geography of the State of New York.

The Family and School Monitor; a Chart, by James Henry: Published by J. H. Colton, 86 Cedar-street, New York.

In this Chart are illustrated numerous subjects connected with physical, moral, and intellectual education. The mind that is early imbued with maxims whose wisdom and adaptation meet the various wants of young persons while their characters are in the process of forming, is most likely to imbibe an enduring relish for knowledge and virtue. This Chart represents symbolically, a temple of chaste and beautiful proportions. It consists of a Tuscan portico of four columns, drawn in conformity with the rules of art. The appropriateness of the symbols setting forth the circumstances of an enlightened state, and the preceptive wisdom that adorns the entablatures and spaces, will commend this Chart to those who want a work of taste and instruction hanging in their school-houses and studies.

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THE

AMERICAN JOURNAL OF EDUCATION:

A MONTHLY MAGAZINE.

EDITED BY

JOSEPH McKEEN, A. M.

PRESIDENT OF THE TEACHERS' ASSOCIATION OF THE STATE OF NEW YORK.

VOL. I. FEBRUARY, 1847. NO. I.

NEW YORK:

PUBLISHED BY LEWIS & BROWN,

135 NASSAU, AND 272 PEARL STREETS.

1847.

EIGHTEEN CENTS SINGLE.

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135 NASSAU, AND 272 PEARL STREETS.
1847.

EIGHTEEN CENTS SINGLE.

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EIGHTEEN CENTS SINGLE.

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EDITED BY JOHN B. NEWMAN, M. D.

Gratified at the reception given by both the Press and the Public, to their Botanical enterprise, the Publishers waited till the success of the Monthly Flora was no longer doubtful, to respond to the call for a work on the Animal Kingdom in the same style. There are many thousands in the country anxious to acquire information on this subject, but deterred from prosecuting the study, as much by the technicality and anatomical detail of the works relating to it, as by their extreme costliness. In the present undertaking, these faults are entirely remedied.

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OF THE

AMERICAN

JOURNAL OF EDUCATION.

We propose to publish a Monthly Periodical, to be called the American Journal of Education. As its name implies, it will be devoted to the general subject of Education, embracing every grade of instruction, from the Primary School to the University. Many of the ablest writers, and most accomplished educators of our country, are already pledged as contributors to this work. It is expected also that numerous friends to the interests of literature and science, whose acquirements qualify them for the task, and whose benevolence makes them desirous of diffusing knowledge among men, will become occasional writers for the *American Journal of Education.* It is intended that it shall be a Repository of whatever is most useful to the teacher, in his heaven-born purpose of developing the minds of youth; that it shall be a Magazine from which stores of useful knowledge may be drawn, pertaining to a rational and christian education.

Several of the States are supplied with Newspapers or other Periodicals, that are devoted to the preliminary interests of our general subject, such as School Laws, Superintendents' Reports, Teachers' Institutes, County and other Conventions, but it is believed there is no Monthly of the kind here proposed. Formerly, the Quarterly Journal of Education published in London, and the Annals of Education published in Boston, were eminently useful, and afforded a fund of valuable information for the Teachers of the two Countries. But these have long since been discontinued, and it is hoped that the present publication may in some measure supply their place. It will be partly original and partly selected; will scrupulously avoid all unprofitable controversies, and irrelevant topics; and will contain occasional embellishments, diagrams and illustrations, as the subjects may require. It will be edited by Joseph McKeen, A. M., President of the Association of Teachers of the State of New York, to whom was confided the Chairmanship of the Committee on the subject of an Educational Periodical, at the annual meeting of that Association in August last.

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A MONTHLY MAGAZINE.

EDITED BY

JOSEPH McKEEN, A. M.

PRESIDENT OF THE TEACHERS' ASSOCIATION OF THE STATE OF NEW YORK.

VOL. I. MAY, 1847. NO. 4.

NEW YORK:

PUBLISHED AT 135 NASSAU-STREET.

1847.

EIGHTEEN CENTS SINGLE.

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The American Journal of Education is a work which will supply a desideratum long felt among us. It will embrace articles on all the multiplied topics falling within its purview, carefully excepting those savoring of religious and political controversial views. The statistics of education, and incidentally of pauperism and crime, will also be given at proper intervals. We heartily welcome this accession to our literature.—*Eureka.*

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The American Journal of Education.—This new monthly is introduced under favorable auspices, promises to be ably and wisely conducted, and we commend it to the warm support of American teachers. It deserves to live, and we hope it will.—*Observer.*

This is a Magazine which at once recommends itself to every one of our citizens, and which calls for their prompt and efficient support. The work is, in short, devoted to every subject that might be calculated to advance the cause of education, or incite a thirst for knowledge in the mind of those who are negligent and careless.—*Times and Journal.*

We have received the Journal of Education—a Monthly Magazine. With this work we are altogether delighted. It is replete with information of the utmost utility, and is eminently calculated to subserve the interests of general education. Every family in the Union should foster this work, for we know that its salutary influence could not fail to be felt. Joseph McKeen, Esq. is the editor, and very ably and judiciously does he discharge his duties.—*Times.*

The Journal of Education is written in the proper spirit, and deserves to be read by every one who desires—and who does not?—the intellectual advancement of these States.—*Loudoun Chronicle.*

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Having spent some twelve years of our life in practical teaching, we very naturally feel great interest in the Journal of Education. Upon an examination of the articles, we like them exceedingly. We wish the work great success.—*Meth. Prot.*

In addition to the preceding commendatory notices, equally flattering testimonials have been bestowed on the *American Journal of Education* by many of the leading Newspapers and Magazines in different sections of the Union.

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NOTICE.

☞ The Patrons and Subscribers are hereby advertised that I have made arrangements to publish in the city of New-York, "The Teachers' Advocate," now published in Syracuse.—This paper was got up under the fostering care and patronage of the State Association of Teachers; and it is one of the objects of strong desire with me, to preserve its conservati[ve] whole profession. It has also been a subject of anxious s[olici]nize all the various interests of the Teachers of this State, s[o as to be] induced and enabled to move on as one man in the sacred [cause] of Education, in which they are engaged. To this end, it [was] that it would be best to unite for the present on one paper. [It will] hereafter be a semi-monthly, published at the low price of [one] advance, containing about as much as the Journal now contains, and so diversified in its character as to meet the objects of the various classes of readers. This arrangement has been made at a heavy expense, and the undersigned will be much disappointed if it does not meet the hearty concurrence of the whole body of teachers. Great effort will be made, under favorable circumstances, not only to sustain, but to increase the usefulness and reputation of the Advocate; and if it shall be decided in the Association in August, when the present number of the Advocate shall be finished, that the octavo form of publication is preferable, we shall return to that form and complete the volume of the Journal of Education, now at its fourth number.

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